THE PROFESSIONAL MAGAZINE FOR ELECTRONICS AND COMPUTER SERVICING

ELECTRONIC Servicing & Technology

March 1996

Product directory • Services directory • Mailing addresses

Replacement parts/Components directory

1996 Electronic Servicing Buyers' Guide

U.S. $3.00

03 >

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NEW Products for Electronic Service and Repair

BrushClean™ System

Now there is a fast, safe, effective way to give contaminants the brush-off. The new BrushClean™ System combines powerful solvents with the gentle scrubbing action of a brush. Use three ways: spot clean economically with the brush, flush under SMDs with the extension tube, or clean large areas with the spray nozzle. Three powerful tools – one convenient package.

Now available:

CFC Free Flux-Off® 2000
Cleaning system quickly and completely removes R, RMA, RA and synthetic flux.

Flux-Off® II
Proprietary alcohol blend cleaning system removes water soluble and all other fluxes quickly.

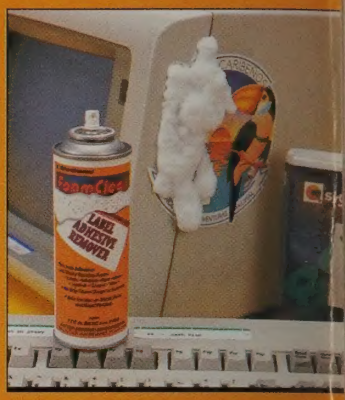
CFC Free Electro-Wash® 2000
Fast drying one step cleaning and degreasing system safe for most plastics.

Pow-R-Wash™
Highly effective nonflammable precision cleaning system safe for use on metals and most plastics.

The BrushClean System features the new All-Way Spray Valve that sprays in any direction, even upside down!

FoamClean™ Label Adhesive Remover

At last—an easy way to remove the grime collecting adhesive residue left behind by tape, stickers and labels. It's as simple as peel, spray and wipe. This hard working foam is engineered to be safe for use on plastics, and it even clings to vertical surfaces! And that means no runs, no drips and no puddles to clean up. Count on Label Adhesive Remover to get you out of sticky situations.



Using FoamClean Label Adhesive Remover.

Label Adhesive Remover is engineered to restore office equipment to like new condition:

Step One
Peel away label.

Step Two
Spray foam onto sticky residue.

Step Three
Wait for foam to collapse and wipe clean.

It's that simple! Thoroughly removes sticky residue left by:

• labels • stickers • tape • gum • lipstick • crayon

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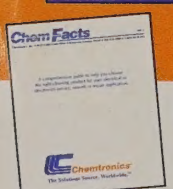

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Company _____

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City _____ State _____ Zip _____

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❑ Production ❑ Service and Repair ❑ Other

Number of technicians using the type of cleaning product in this ad _____

Which best describes your role:
❑ Recommend/specify products ❑ Purchase ❑ Other

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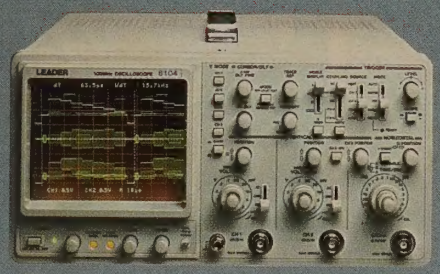
You Shouldn't Have To Mortgage Your Business To Get The Tools Of The Trade!

The difference between success and failure is strictly determined by your bottom line. The service center that can best contain their costs while providing excellent service at affordable repair rates will survive these tough times and eventually succeed. Providing affordable and reasonable repair rates to your customers is ultimately determined by the costs of your operation. Leader Instruments Corporation has been providing the worldwide electronics production and service markets with high quality, high reliability instruments at affordable prices. Listed below you will find a small sample of our products — loaded with features at prices you can afford. Call 1 800 645-5104 (in NY State call 1 516 231-6900) for a copy of our full line catalog .

$1,945

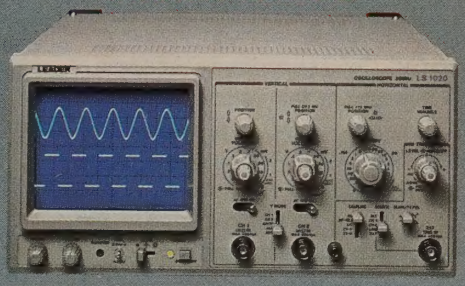
Model 8104 100-MHz 3-Channel CRT Readout Oscilloscope



Loaded with features, the Model 8104 boasts 100-MHz bandwidth with cursors and CRT readout of all critical waveform parameters for ease-of-use. 1 mV/div sensitivity, 3-channel operation, extensive video triggering and dual timebase are standard. All 3 channels can be monitored simultaneously along with their second timebase and the difference (CH1-CH2) can also be displayed — providing 8-trace display capabilities for extensive troubleshooting. The Model 8103, priced at $1,645, includes all of the features of the 8104 except for CRT readout.

$525

LS 1020 20-MHz 2-Channel Oscilloscope



Developed specifically for the electronics production and service industries, the LS 1020 is equipped with features typically found only on higher bandwidth scopes. It is ideal for use on the audio bench, and can be used as a second scope for video troubleshooting as well. The unit is equipped with TV-V and TV-H coupling, has a 5 mV/div sensitivity (0.5 mV/div with X10 on), and includes both CHOP and ALT vertical mode functions. Rugged and reliable, the LS 1020 provides service professionals with an affordable choice without compromising features or quality.

$395

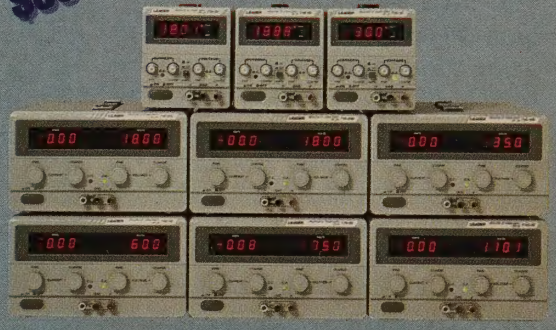
LTC-905 Semiconductor Curve Tracer

STOP REPLACING GOOD PARTS!

Use this handy semiconductor curve tracer with any oscilloscope (must be equipped with X-Y mode) and test transistors, triacs, UJTs, SCRs, FETs, MOSFETs, as well as zener, signal and rectifier diodes. The LTC-905 will measure (both in and out of circuit) gain (beta), cutoff, leakage and output admittance. Affordably priced and full featured, the LTC-905 is a "must have" for any serious repair center.

Starting at $354

700 Series Digital Display Power Supplies



A wide variety of power supplies are available from Leader. The 700 Series single output digital display power supplies can be operated in constant voltage or constant current modes. Digital readout of voltage and current is provided. Triple output power supplies are also available from Leader. For a detailed listing of our DC power supplies call 1 800 645-5104 (in NY State call 1 516 231-6900.)

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Circle (7) For Product Information & Demonstration

THE PROFESSIONAL MAGAZINE FOR ELECTRONICS AND COMPUTER SERVICING

ELECTRONIC Servicing & Technology

Volume 16, No. 3 March 1996

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14 Motors in consumer electronics
By The ES&T Staff
The expansion of consumer electronics from the traditional products such as TVs, VCRs, etc. has meant an increase in the number and types of motors that a technician will encounter and possibly have to service. This article addresses these concerns and how to go about dealing with them.

16 A technician's glossary
By The ES&T Staff
These days, the internet is beginning to intrude into the lives of technicians whether they like it or not. So, for those technicians who wish to start communicating via the 'net', **ES&T** has provided a glossary of words to help you become more familiar with this process.

1996 Buyer's Guide

Running a service center takes technical skills, management ability, a comprehensive library of technical literature, and a broad range of tools, test equipment, accessories and replacement parts. The **Electronic Servicing and Technology** Buyer's Guide contains information on hundreds of manufacturers and distributors who make and sell thousands of products. We have scanned the literature and attended trade shows that have to do with new areas of interest to **ES&T** readers and have come up with this list.

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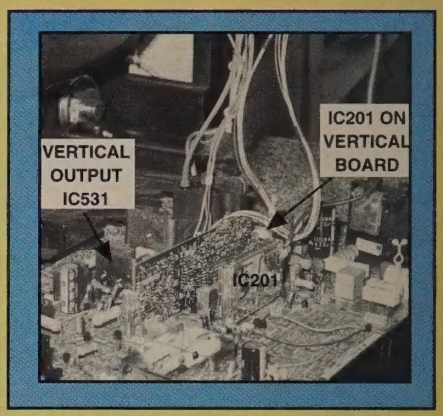

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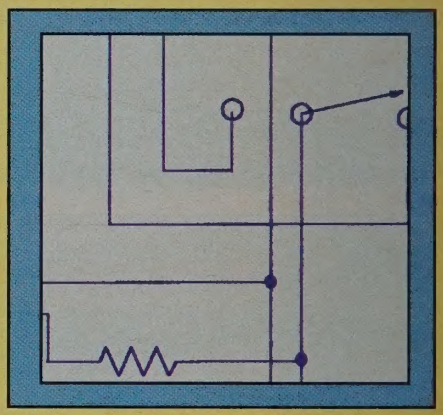

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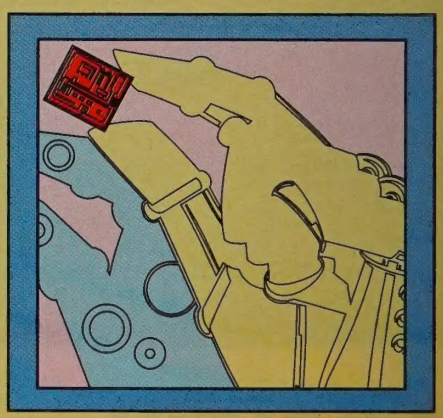

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ON THE COVER

Today's consumer electronics servicing technician is faced with a huge array of products, manufacturers, brands, and models, many of which incorporate a host of unique, specially designed and manufactured components. The annual Buyer's Guide brings all of this information together in a comprehensive list that will help any servicer bring his business into the computer age.

THE PROFESSIONAL MAGAZINE FOR ELECTRONICS AND COMPUTER SERVICING

ELECTRONIC
Servicing & Technology

Electronic Servicing & Technology is edited for servicing professionals who service consumer electronics equipment. This includes service technicians, field service personnel and avid servicing enthusiasts who repair and maintain audio, video, computer and other consumer electronics equipment.

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WAVETEK

Listening to our readers

A magazine, a newspaper, a TV program; any one of these forms of mass communication can only be as good, and as useful, to the people who read or watch, as the usefulness of the information conveyed. That's the reason that this magazine publishes nothing but articles on the servicing of consumer electronics. That's what our readers do, and that's our reason for being.

And that's why the editors attend trade shows and association meetings, and pay visits and make calls to service centers. Visiting with the owners, service managers and technicians from service centers throughout the country helps us to understand the problems servicers face and gain a deeper understanding of their information needs.

Letters and telephone calls from readers asking specific questions are also helpful. Every letter and every telephone call tells us a little more about what readers need to know.

Another avenue of communication between **ES&T** and readers are the Reader Survey Cards we include in every issue. *We* often think that certain types of articles would be useful, but what do the *readers* think? Are the readers really concerned about the subject under consideration for an article? Do they already know what they need to know, thus making an article on that subject superfluous? The responses to the questions on the bound-in **ES&T** Reader Survey Cards help us to perform that kind of evaluation.

In the Reader Survey Card in the November issue we explored the subject of soldering/desoldering. Seventy-seven readers took the time to fill out answers to the questions on that card. We really appreciate the time and effort put forth by those people. It provided us with some very useful information, which we intend to use in soldering/desoldering articles in future issues.

In response to the question "'Do you have any special soldering/desoldering equipment?," 31 respondents said no, 36 said they use special soldering tips, 12 said they use a hot-air system, and 9 others said they use some other type of special equipment.

Readers who used some other type of special soldering/desoldering equipment specified such products as solder suckers, desoldering braids, solder tweezers, PC board rework systems, low melting alloys, butane torch/soldering iron, and desoldering stations.

You'll note in many of these discussions that the answers add up to more than 100% or more than the total number of responses. That's because many respondents gave multiple answers. For example, some readers may have said that they use special soldering tips, and they also use a hot-air system, and possibly some other type of special equipment as well.

In response to the question "Do you use any special jigs/fixtures to hold chassis/PC boards?," we received quite a variety of answers. Thirty-seven respondents said they did not use any special jigs or fixtures, but the other respondents said that they do. Nineteen respondents said that they use PC board holders, seven use a vise of some kind, and several said that they use either a homemade jig or fixture or "helping hands," the type of holder that consists of a weighted base with several alligator clips on universal joints. Other special fixtures mentioned were tweezers, and one specified that he uses a combination portable workbench/vise.

The respondents showed a great degree of ingenuity and creativity in their answers to the question "Do you use specialized tools/devices to pick up and place small components?" Twenty-nine respondents said that they do not use any specialized tools/devices, but the answers of the rest of the respondents ran the gamut from typical service tools to devices borrowed from the medical/dental profession, and even the kitchen. Here is a list of the tools mentioned, in no special order: pliers, screwdrivers, tweezers, magnetic tools, vacuum tool, hemostats and other various medical tools, wood sticks, dentists picks and tools, homemade holding devices, the vacuum tool portion of a solder station, a homemade vacuum tool, a pick, a scratch awl, ice cube tongs, IC inserters/extractors.

In answer to the question "Do you use special lighting/magnification to help see tiny parts?," surprisingly, nine sharp eyed respondents said no. The remaining respondents use a wide variety of visual assistance. Nine, for example, use some type of special task lighting to help them see. Most of the others use some type of magnification as well.

Here is a list of some of the magnification methods mentioned by these respondents: handheld magnifier, magnifier lamp, jeweler's loupe, microscope, camera imaging system, visor magnifier, magnifying spectacles attached to glasses. Two respondents even mentioned that they use a video camera trained on the area of interest (one mentioned using the macro function on the lens), with the picture on a fairly large screen TV.

Judging by these responses, the subject of use of aids in handling PC boards, tiny components and soldering/desoldering continues to be one on which continued discussion is needed. We'll be serving up some more articles on these important areas in the future.

Nils Conrad Persson

Consumers highly satisfied with their consumer electronics products

Owners of full stereo systems voice high levels of satisfaction with their equipment, the Consumer Electronics Group of the Electronic Industries Association (EIA/CEG) reported today.

A survey, conducted in May and announced at the CES Specialty Audio and Home Theater Show found that 58 percent of the stereo system owners are "very satisfied" with the quality of the sound from their equipment, while less than 4 percent said they were not satisfied.

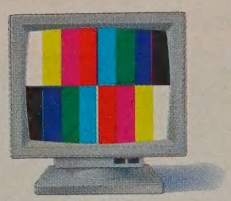
In addition, EIA/CEG asked the 500 stereo owners to identify recreational and leisure time products they owned and to then compare that product's "entertainment value for the money" with their audio equipment. The results:

- 76 percent say their specialty audio equipment is a better value than their pool table; 14 percent say the two are equal.
- 69 percent say their specialty audio equipment is a better value than their exercise equipment; 14 percent say the values of the two are equal.
- 59 percent say their specialty audio equipment is a better value than their hot tub; 11 percent say the two are equal.
- 49 percent say their specialty audio equipment is a better value than their boat; 14 percent say the two are equal.
- 48 percent say their specialty audio equipment is a better value than their motorcycles; 20 percent say the two are equal.
- 43 percent say their specialty audio equipment is a better value than their camper or motor home; 21 percent say the values of the two are equal.
- 43 percent say their specialty audio equipment is a better value than their pool; 13 percent the two are equal.

In each comparison, those who had an opinion and did not select the stereo system as a better value said the other product was a better value.

Information contained in this release was obtained during May 1995 via telephone interviews. Approximately 1,200 interviews were conducted with U.S. heads of households across three groups: 500 home theater system owners, 574 component stereo systems owners, 500 randomly selected consumers not owning a home theater or stereo system. Individual samples will not add to total interviews since some consumers owned both a home theater system and a stereo system. Survey questions were designed by CEG and administered by the Verity Group, Inc. from their headquarters in Fullerton, CA. All results have a margin of error of +/- 4 percentage points. ■

Test all these...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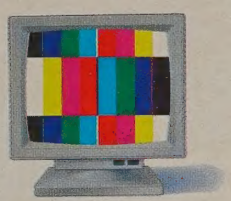
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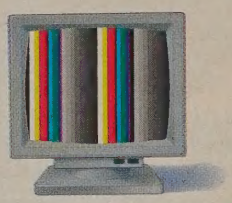
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VGA
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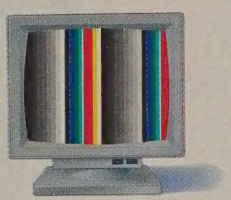
SVGA
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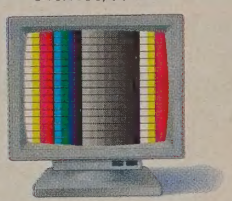
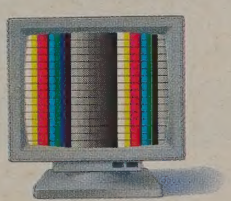
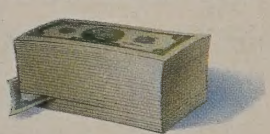

SVGA
1024x768 NI /60 Hz


MAC II
640x480/67 Hz

For a lot less of these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LITERATURE

Electronic repair center website

Anatek Corporation has established the Electronic Repair Center (ERC) for hardware service and repair professionals on the World Wide Web at http://www.anatekcorp.com/repair.htm.

ERC includes a technician's forum where users submit repair tips, supplier information, technical articles, questions, and answers to questions from other users. All of the data submitted is posted in searchable databases: repair tips on monitors, televisions, VCRs and printers; technical articles on hardware repair topics; the question and answer database.

More than 100 electronic component suppliers are listed with links to WWW sites. Suppliers are listed in a supplier contact database and are cross-referenced by component type. A supplier ranking survey form is available where users can identify their favorite suppliers for various components. The results of the survey will be posted at ERC.

The site also includes links to many Internet sites of interest to service and repair professionals.

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Publisher now on world wide web

Digital Press, a publisher of books for computing professionals, has announced the establishment of a new home page on the World Wide Web.

The site—located at http://www.bh.com/bh/dp/—contains descriptions for over 120 titles. Individual book pages include title, detailed description, contents, author and bibliographic information. The site also includes information on how to order books or free catalogs, as well as links to affiliated web sites.

An e-mail mailing list is available for readers to learn about news releases, special offers and other news from Digital Press. Anyone interested in being added to the e-mail mailing list can e-mail a request to majordomo@world.std.com; include in the message body (not in subject line) subscribe digital-press.

Digital Press, publisher of many books for computing professionals including *The SQL Server Handbook, Advanced Ethernet/802.3 Management and Performance, Second Edition*, and the *X Window System* by Scheifler and Gettys, is an imprint of Butterworth-Heinemann, a publisher for professionals in the technical and medical areas. Other imprints of Butterworth-Heinemann include Focal Press and Butterworth Architecture.

Circle (92) on Reply Card

New 1996 catalog

RNJ Electronics Inc. is now offering their free new 1996 catalog containing 136 pages of test equipment, video and audio accessories, TV, VCR and microwave oven parts, IC's, tools and soldering equipment. It also contains CCTV equipment as well as background sound and home theater equipment.

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Electronics books catalog

Butterworth-Heinemann, a publisher of books for electronics professionals, has announced the availability of its 1996 Electronics Books Catalog.

The free 24-page catalog contains descriptions for over 130 books, including 52 new titles. Books are listed in the categories of circuit design, test and measurement, packaging and production, computer electronics, communications, electronic business, and security.

Included among the new titles introduced are such books as *Inside OrCad* by Chris Schroeder, *Inside PC Card* by Faisal Haque, *The Art and Science of Analog Circuit Design* by Jim Williams, and two new titles from John Lenk: *Simplified Design of IC Amplifiers and Simplified Design* of *Micropower and Battery Circuits.*

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Book catalog

Digital Press, a publisher of books for computing professionals, has announced the availability of its 1996 Digital Press Books Catalog.

The free 24-page catalog contains descriptions for over 120 books, including 45 new titles not previously listed. It announces the publication of such new books as *The SQL Server Handbook: A Guide to Microsoft Database Computing; Advanced Ethernet/802.3 Management and Performance, Second Edition; and Software Implementation Techniques: Writing Software in OpenVMS, UNIX, OS/2 and Windows NT, Second Edition.*

Also included is the announcement of the publication this spring of the new revised edition of *The X Window System* by Scheifler and Gettys. These comprehensive new volumes cover the libraries, standards, and protocols of X Version 11, Release 6.1.

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Electronics book publisher

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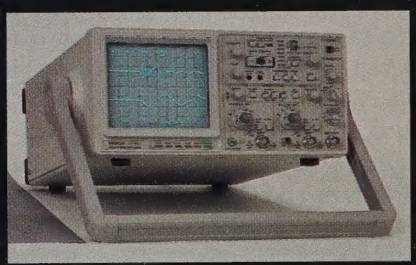

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Servicing the vertical circuits in the Sharp 19SB60R

By Homer L. Davidson

The vertical circuits in a TV set are much easier to service than the horizontal circuits. Absence of vertical sweep results in a horizontal white line on the screen. Insufficient sweep causes a black area at the top or bottom of the picture, or both.

Intermittent vertical sweep circuits may be more difficult to service. If two or more components in the vertical circuits are defective, this can complicate matters, and the problem may be very difficult to locate. This can take up a great deal of valuable service time.

Most problems in the vertical circuits are the result of a leaky vertical output transistor or IC. The vertical output of earlier model sets consisted of two vertical output transistors, while in today's chassis, a vertical output IC takes their place (Figure 1). If an output transistor is open or leaky, the symptom may be insufficient vertical sweep, intermittent raster, or no sweep, resulting in a horizontal white line. The same symptoms can occur if the vertical output IC is defective.

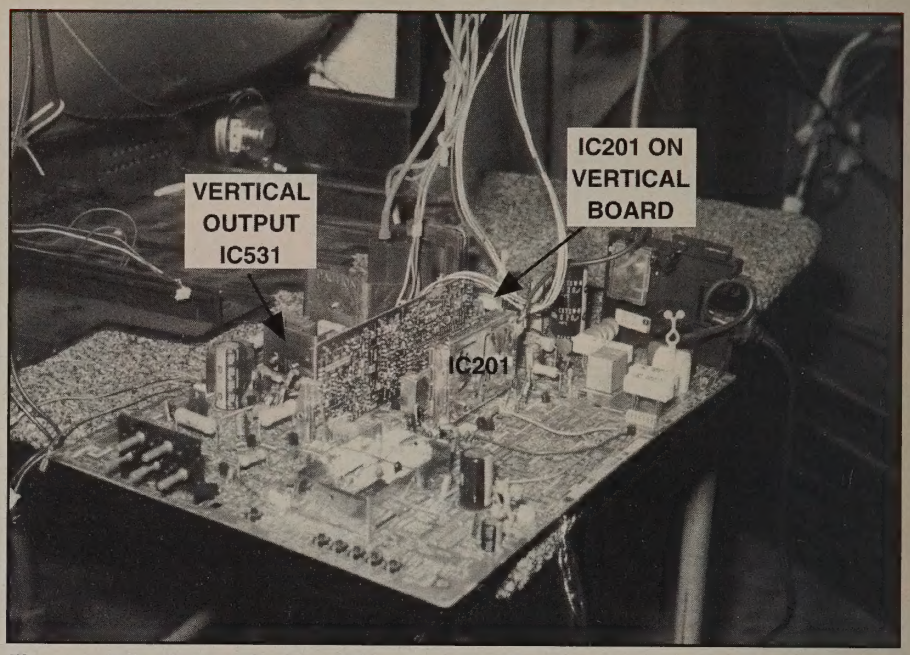

Figure 1. This photograph shows the various vertical semiconductors located on the Sharp 19SB60R chassis.

Components connected to the vertical circuits can break down and cause intermittent vertical sweep, insufficient sweep, or absence of vertical sweep. A 100µF capacitor in the vertical output circuits has been known to cause intermittent or no vertical sweep. Incorrect voltage from the low voltage power sources feeding both the vertical deflection IC and output circuits can result in insufficient vertical sweep or absence of vertical sweep. A leaky vertical output IC can destroy components in the low voltage power supply.

By observing the vertical output waveforms of each IC, you can quickly determine if the IC or other parts in that circuit are defective.

In the Sharp 19SB60R, IC201 contains the VIF/SIF/Sync/Chroma/vertical and horizontal deflection circuits. Check for a drive waveform at pin 3 of IC201. This vertical drive waveform should be around 4V in this portable set. The vertical output yoke drive pulse should have an amplitude of close to 50V.

Davidson is a TV servicing consultant for **ES&T**.

Servicing vertical circuits without a schematic

When a schematic is not available for a certain TV chassis, start your diagnosis by locating the vertical components on the TV chassis. Most vertical output transistors and vertical output ICs are located on separate heat sinks. In the latest TV chassis, the vertical and horizontal deflection circuits are located in one large IC near the vertical output components (Figure 2). In fact, in this Sharp chassis there are two large IC's, IC1001 and IC201. IC1001 contains the system control CPU circuits while IC201 covers most of the working TV circuits.

IC1001 is located on the main chassis inside a shielded area. IC201 is on a vertical mounting board in the middle of the chassis. If you don't know which IC relates to the vertical deflection circuits, note the Sharp part numbers stamped on top of the ICs and look them up in the universal replacement manual.

The part number of IC201 (VHITDA8305A-1) or TDA8305 is not even listed in Howard Sams Photofacts. Look up the part number in the universal manual for the deflection IC. This will provide you with the supply voltage and pin outlines. Once you know the pinout information for the IC, you will know which are the vertical sweep pins, and you'll be able to observe the vertical and horizontal sweep waveforms. Of course, without documentation you won't know what the exact amplitude or voltage of the drive waveform should be, but this waveform varies from 1.5V to 5V in most TV chassis of recent manufacture (Figure 3).

Locate the vertical output power IC. It's on a separate heat sink. If in doubt, find the part number stamped on the IC and look up the information listed for the universal replacement in one of the semiconductor manuals. This will provide you with information such as the specified supply voltage and pin assignments. Another method is to check for the highest dc voltage found on any pin of the IC. Usually, the vertical output IC operates from

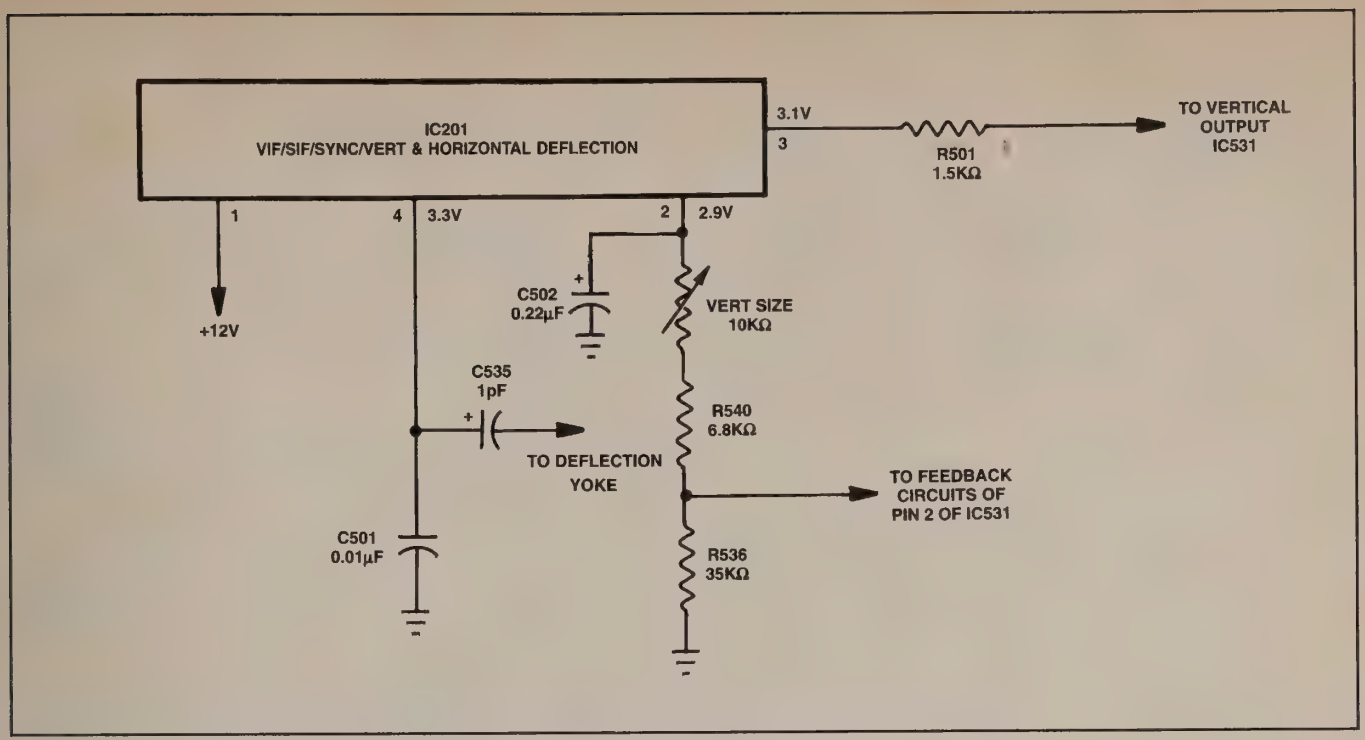

Figure 2. The vertical and horizontal deflection circuits of the Sharp 19SB60R are in IC201.

a source voltage of 20V to 35V. With the exception of the horizontal output transistor, the vertical circuits have a higher voltage source than any other IC component. IC531 is located on a grounded heat sink at one side of the Sharp TV chassis.

Vertical power supply circuits

In modern TV sets, the vertical voltage supply source for the deflection and output ICs are taken from the flyback derived-voltage circuits. Often the higher output voltage for IC531 is taken from a separate winding with a single diode rectifier. The deflection IC voltage source is taken from a voltage regulator circuit (Figure 4). Here we find a transistor and zener diode regulation circuit.

In the Sharp 19SB60R chassis, the 24V source for the vertical output IC is fed from D532 and filtered with C536. The 12V source feeding the deflection IC201 is supplied from voltage regulator transistor Q704 and zener diodes D723 and D722. A shorted or leaky zener diode can lower the deflection voltage source, while an open regulator transistor results in zero output voltage. A leaky Q704 may lower or raise the deflection voltage source.

A leaky diode D532 in the 24V source results in lower supply voltage at the output IC531. Often, when D532 becomes shorted, R541 (1Ω) may open up and become warm, resulting in chassis shutdown. If capacitor C536 opens or becomes reduced in capacitance the 24V source will become lower in voltage. A leaky C536 will also lower the dc source.

Horizontal white line

Just about any component within the vertical circuits can cause absence of vertical sweep. The most troublesome components in the vertical circuits are the vertical output IC, transistors, diodes, electrolytic capacitors, and incorrect source voltages. In this Sharp chassis, these components consist of IC531, C534, D531 and the 24V source. If the symptom is that the picture has been reduced to a horizontal white line, the cause may be an

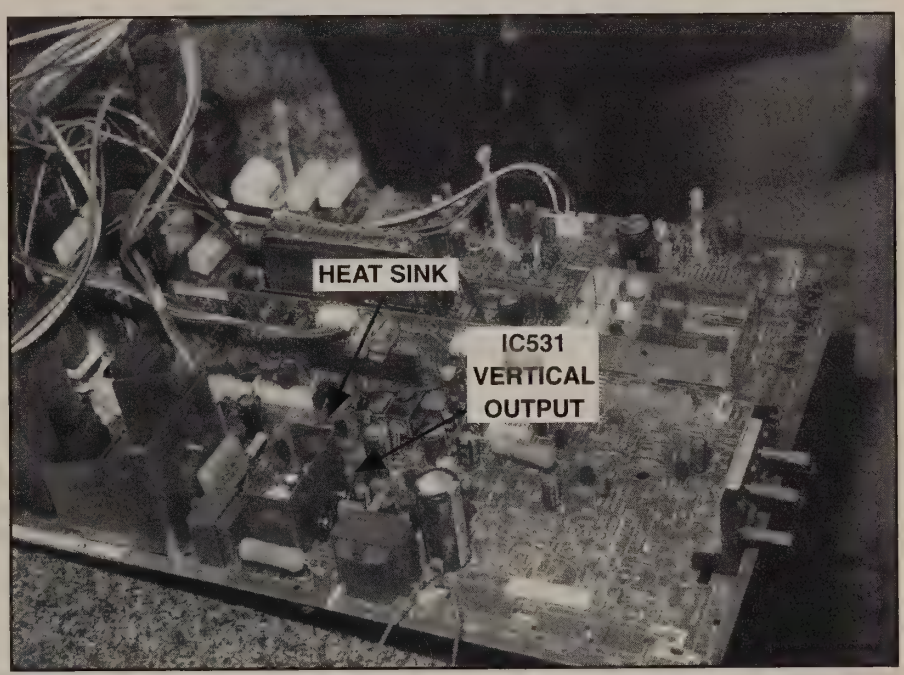

Figure 3. The vertical output IC, IC531, is located on a separate heat sink.

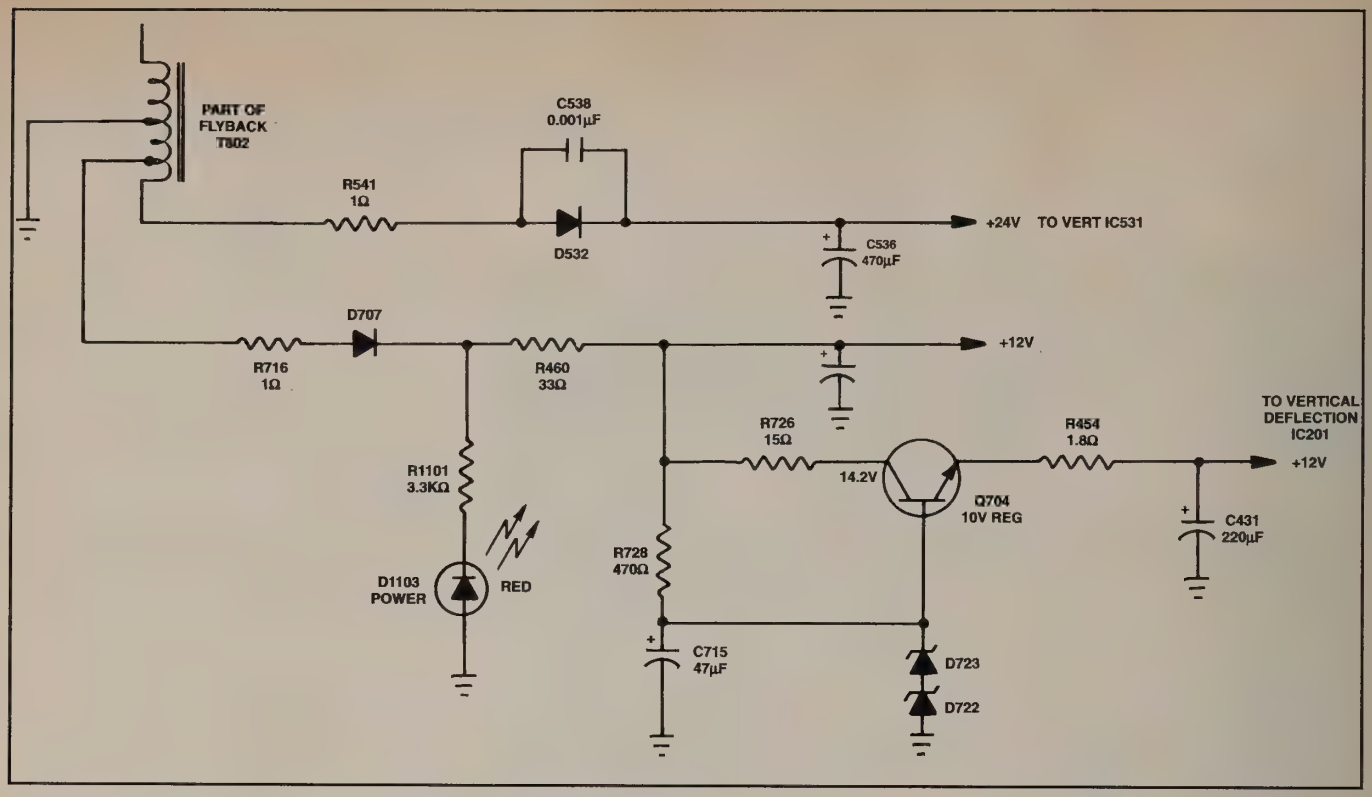

Figure 4. The 12V regulated source supplies voltage to IC201 deflection circuits, and a 24V source is fed to the vertical output IC, IC531.

open yoke winding, a faulty electrolytic coupling capacitor, or a faulty return resistor.

Observation of waveforms and voltage measurements will help to locate the defective component or components in the vertical circuits. Observation of the waveform at the vertical output IC can determine if the deflection IC and output circuits are normal. If the waveforms are normal at this point in the circuit, suspect the yoke, return and feedback circuits. Notice if the vertical input waveform at the output of the IC is normal with the unstable pulse feeding the ver-

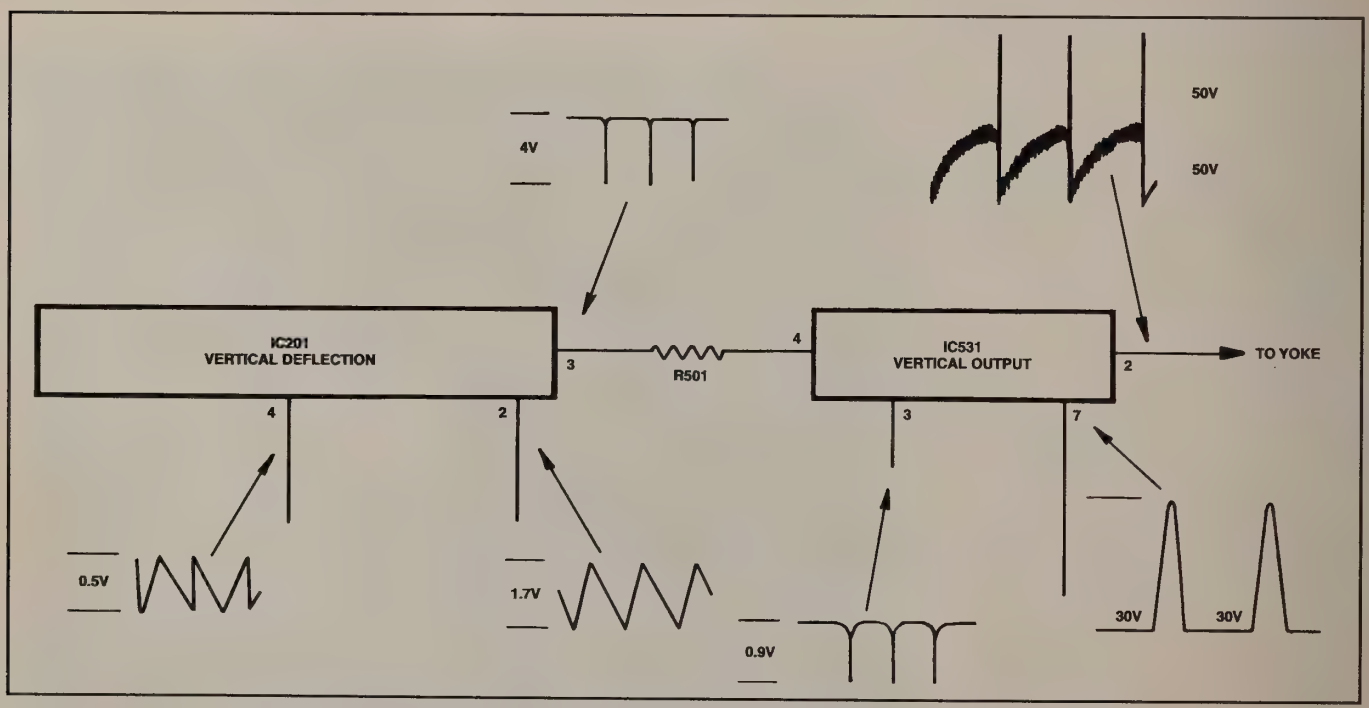

Figure 5. Observe waveforms on IC201 and IC531 to determine what stage the defective component is located in.

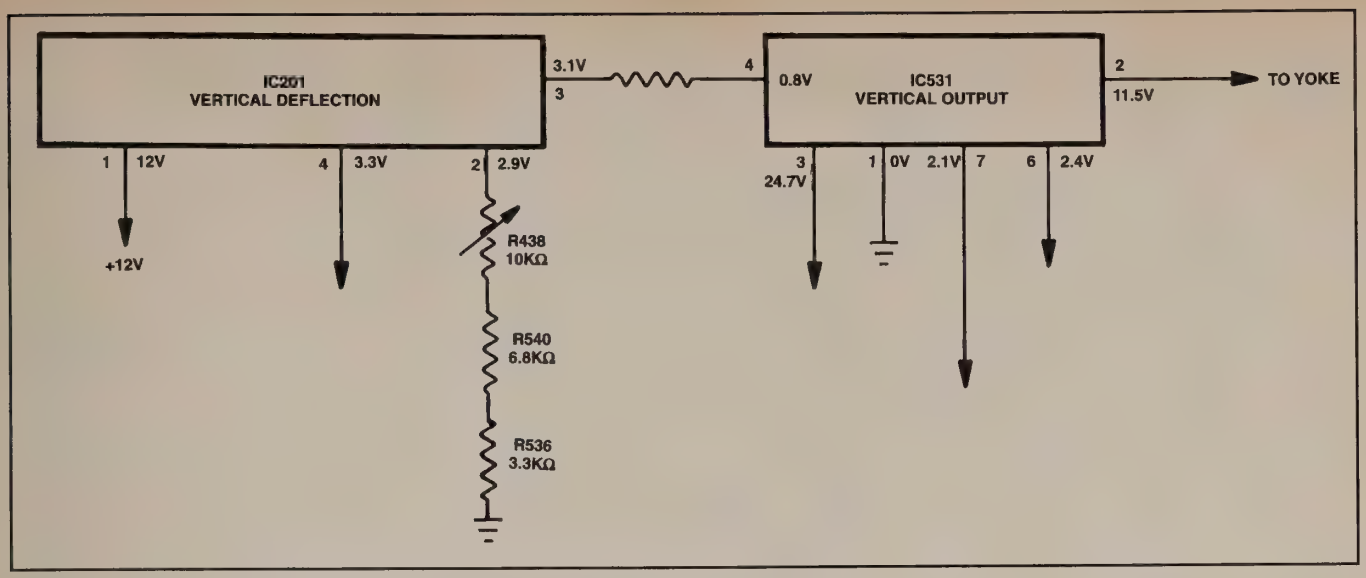

Figure 6. Measure voltage on IC201 and IC531 to determine if either IC is leaky.

tical yoke winding. Determine if the input and output waveforms have the required amplitude and voltage. If not, suspect the deflection circuits.

No vertical sweep - IC201

Use the oscilloscope to observe the vertical deflection waveform at pin 3 of IC201. The amplitude of this drive waveform should be around 4V (Figure 5). If this waveform is not present, suspect IC201 and corresponding circuits. Check the sawtooth feedback waveform at pins 2 and 4 of IC201. Now measure the supply voltage at pin 1. It should be +12V.

If this voltage is incorrect, suspect IC201 or a component in the low voltage supply source: IC201 can become leaky and cause a low voltage at pin 1. To further narrow down the possibilities, disconnect pin 1 from the board by using desoldering braid or a solder sucker. Now measure the voltage at the board connector to which pin 1 of the IC was connected. If the voltage returns to normal, suspect IC201. Measure the resistance from pin 1 to common ground. A low measure-

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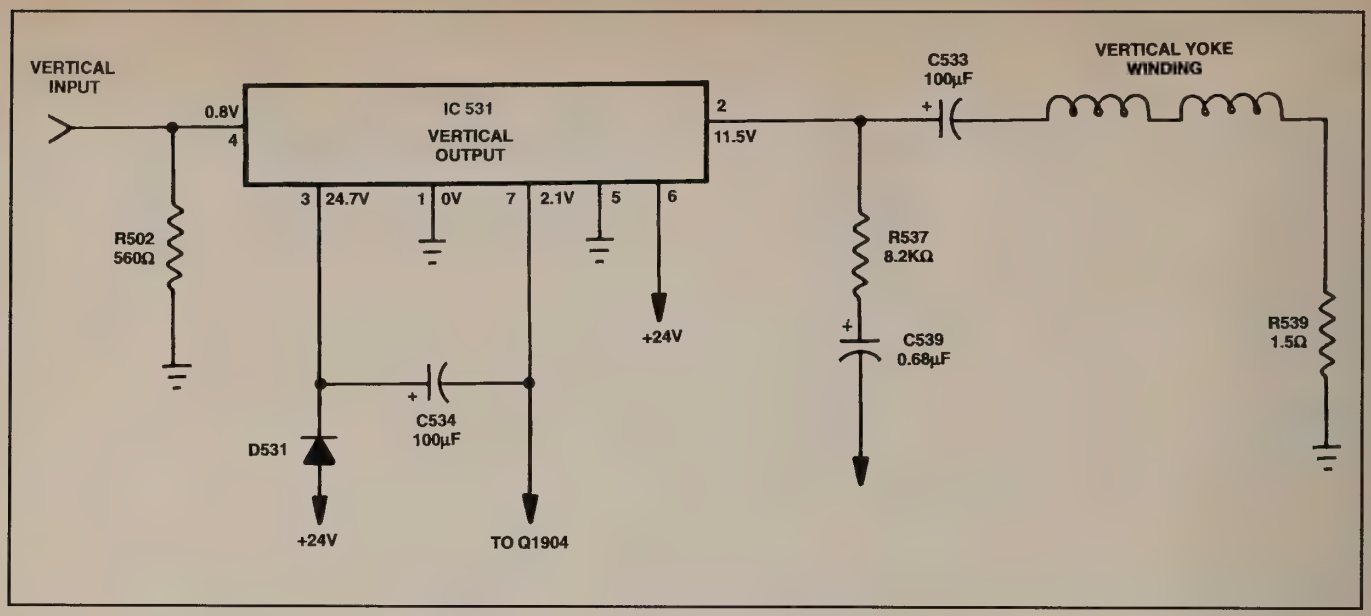

Figure 7. Leaky IC531 can cause improper or no vertical sweep and a low 24V power source.

ment (less than 1KΩ), may indicate a leaky deflection IC.

If IC201 is highly leaky, the heavy leakage currents may have caused components in the 12V source to be damaged. Check R434 (1.8Ω) to see if it is burned or open. Test Q704 for leakage between emitter and collector terminal. Check diodes D722 and D723 for leakage.

Horizontal white line - IC531

If the vertical drive waveform is normal, suspect a defective vertical output IC, IC531. A leaky IC531 can cause the output of the low voltage power supply to be abnormally low, and possibly cause damage to the low voltage power supply. Check the vertical output waveform at pin 2. Measure the supply voltage at pin 6 with around 24V and boosted voltage input at pin 3 (Figure 6).

Scope the waveforms at pins 3 and 7. An incorrect waveform at pin 7 may indicate problems in the vertical sync circuits. Check all components tied to the vertical output IC terminals before replacing the suspected IC. Replace C534 (100µF) since many of these vertical capacitors have caused many sweep problems in other vertical circuits. With one lead of D531 unsoldered to isolate it from the circuit, check it with the diode function of the DMM for leakage. If all other components and voltage sources are normal, replace IC 531.

A white line or improper vertical sweep

Low voltage, or zero voltage from the low voltage power supplies, which pro-

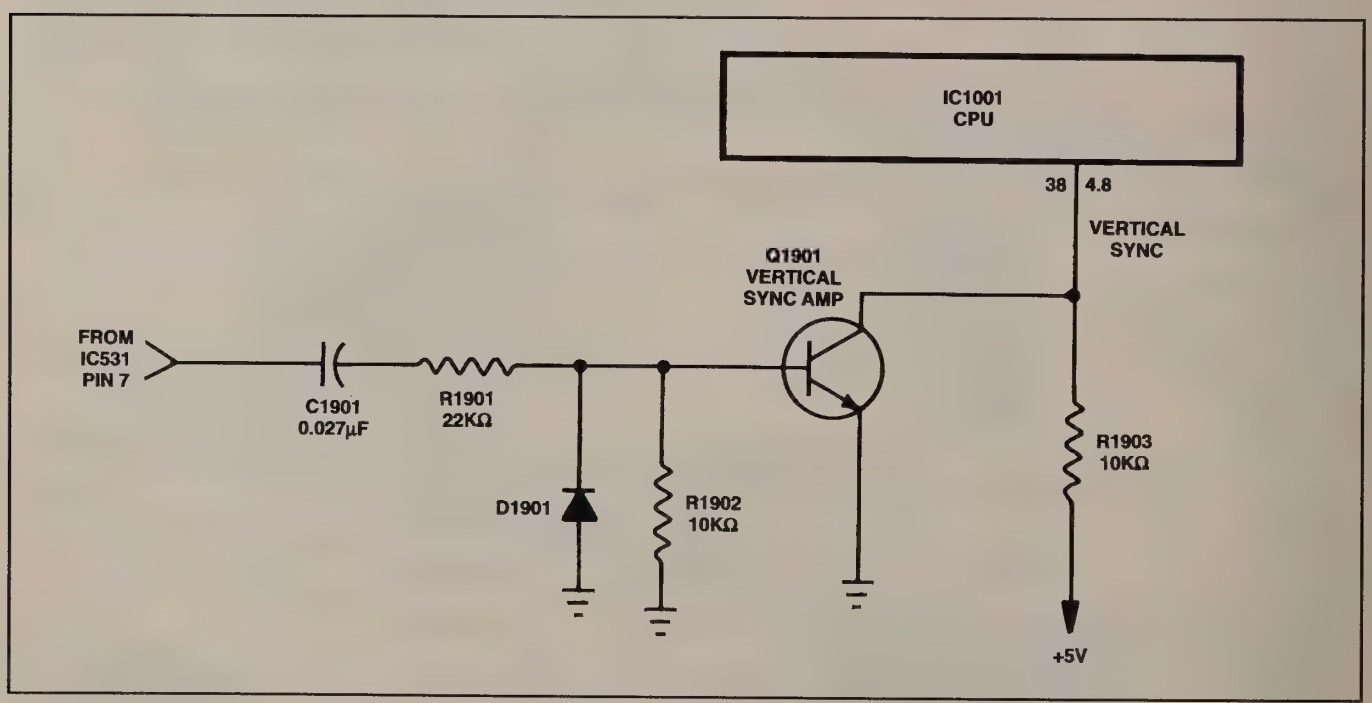

Figure 8. Intermittent vertical sync amplifier (Q1901) terminals produced the intermittent vertical symptom.

vide 12V to the deflection IC201 and 24V to the vertical output IC, IC531, can cause problems that result in the absence of vertical sweep. If either voltage is missing, or if both voltages are missing, when there is only a horizontal white line on the screen, go directly to the scan-derived voltage sources. Usually when both source voltages are missing the chassis is completely shut down.

A low 24V source voltage may result from a burned or leaky D532 diode or C536 (47µF) capacitor. If the vertical output IC, IC531, is leaky, it may cause damage to the diode and isolation resistor. When D532 becomes leaky, R541 (1Ω) will become open. An increase in resistance of R541 may produce a lower voltage to the vertical output IC even if the diode is normal (Figure 7).

Insufficient vertical sweep

I had taken in a Sharp 19SB60R for service. The problem was intermittent absence of vertical sweep. I did not have the correct service literature for this set, so I ordered it from the manufacturer. While waiting for the schematic to arrive, I began to observe waveforms on pins 2 and 4 of IC531. When the vertical sweep failed, the vertical output waveform was very weak indicating a possible defective output IC. Under these conditions, the picture on the screen was less than 1 inch high. At other times only a white horizontal line appeared. The dc voltages at pins 3 and 6 were fairly normal compared to other vertical output circuits.

In my experience, a defective boost capacitor was the cause of this problem in several sets I had serviced, so I replaced capacitor C534 (100µF) in this set. The problem remained. I checked the waveforms again, but they looked normal. I ordered a replacement for IC531. The new part arrived the same day as the schematic.

With a new IC531 installed, the set played for several hours. Unfortunately, after that period of time the picture reduced to a horizontal line. I observed waveforms and measured voltages once again and compared them to the values specified on the new schematic. The only difference between specified and measured values was at pin 7. The amplitude of the 30V waveform was quite low. I resoldered all pins of the new output IC but this did not improve the situation.

According to the schematic, pin 7 of IC351 is connected to the vertical sync circuits. The vertical sync circuits were traced to Q1901, which is located next to Q704, a 12V regulator mounted on the main chassis. When I touched Q1901 with the meter probes the picture became normal. The vertical sync pulse from pin 36 of IC1001 is amplified by this vertical amp (Figure 8). Soldering the terminal connections of Q1901 solved the intermittent vertical raster. Other possible causes of improper vertical linearity and foldover problems are electrolytic capacitors C533, C541, C539, C543 and feedback circuits.

In another chassis, the intermittent vertical sweep was repaired by soldering the contacts of the vertical PCB on which IC201 is mounted. This board is mounted in the center of the chassis. Instead of taking time to trace out the possible defective connections, I soldered all connections on this vertical board to the pc wiring of the main chassis. These vertical problems were finally repaired only after securing the correct circuit diagram.

Parts replacement

IC201 (TDA8305) may not be listed in the universal semiconductor replacement manual, while IC531 can be replaced with a ECG1676 or RCA SK7653 replacement. Both IC's can be obtained from the manufacturers parts depot. If either IC cannot be found locally, they can be obtained from a mail order firm.

Conclusion

Most vertical circuits can be serviced without a schematic by comparing waveforms and voltages at the various vertical circuits and components against those observed in a known chassis. Observation of critical waveforms and voltage measurements can help to quickly locate the defective vertical component. ■

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Circle (72) on Reply Card

Motors in consumer electronics

By The ES&T Staff

The expansion of consumer electronics from the traditional products such as TV and audio to include VCRs, camcorders, CD players, personal computers and more has meant a huge increase in the number and types of motors that a service technician will encounter, and may well be required to diagnose and replace.

For example, a technician servicing a VCR might encounter problems with a cassette loading motor, a head drum motor, a capstan motor, or any of the drive circuits associated with those motors. When it comes to camcorders, there are still other motors: an iris motor, a zoom motor and an autofocus motor.

Complex motors/drive circuits

There was a time when most motors and drive circuits were relatively simple. The demanding requirements of today's complex electronics products, such as VCRs, require motors that can be controlled precisely in terms of both their speed and their absolute position (phase).

All such motor/drive systems require some type of feedback control system that compares the actual speed and position of the motor with the desired speed and position so that corrections may be made continuously to keep the motor precisely controlled. This is necessary in order to keep the picture information being generated during playback, or being recorded during the record process, precisely synchronized. Otherwise, of course, the picture will be unviewable.

Troubleshooting motors

Unfortunately there isn't room in this issue to look at the many types of motors and drive circuits in the consumer electronics products. Plans are to publish a more in-depth article in a future issue. However, there are some straightforward steps that a technician can take to get some idea of the condition of a motor.

For starters, gently turning the motor by hand with power to the unit turned off will tell you if the motor is free to run, or if a bearing has seized up. If the motor moves but its movement seems loose , the problem may be a worn bearing.

Electrical tests of the motor

No matter how complicated the motor, or its drive circuitry may be, all motors still have windings. If a motor refuses to run, consult the service manual to see how the motor is constructed. Ohmmeter readings of the motor's coils will reveal if any are open circuited. An open circuit means that the motor is bad and must be replaced.

Troubleshooting the drive circuits

Some VCR and camcorder motor drive circuits are extremely complex. In some products, in order to eliminate the problems inherent with motor brushes, manu-

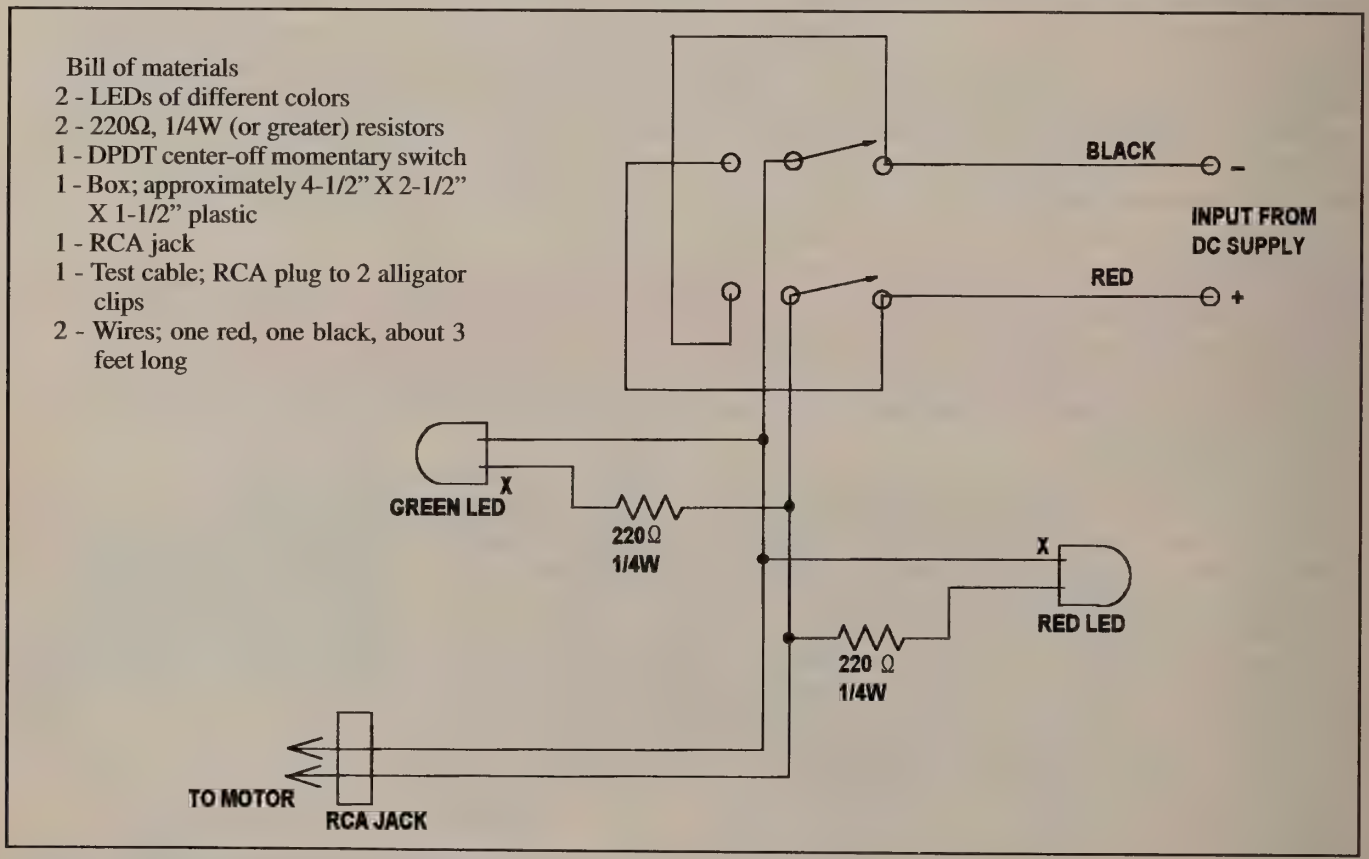

Figure 1. Use this easy to build circuit to diagnose the condition of dc motors.

A handy dc motor control box

By Hugh Thornley

In our service center we found a need for a device that we could use to run dc motors in different units we were repairing. It had to be easy and quick to build and made of parts we had on hand or at an electronics hobby shop, such as Radio Shack. This unit met all the requirements (Figure 1).

Use any small box. Mount a small DPDT momentary center-off switch on top of the box. Mount two different color LEDs, one on either side of the switch. Run one red and one black wire from the box to a dc regulated adjustable dc power supply. Use alligator clips or banana plugs or whatever works best for your supply. A deluxe model may be built with a variable regulated dc supply within the box. We put an RCA-type jack on one end so we could use existing test cable with an RCA plug on one end and alligator clips on the other end. Cables can be any length to suit what is needed.

To use the box, set the dc voltage low to start if you don't know the specified operating voltage for the unit. If you have the service literature for the product, set the voltage specified for the motor. Momentarily move the switch to the closed position and note motor operation or absence of operation. Note the reading of the current meter on the supply. If current is excessive, the motor may be shorted or jammed.

This device is useful for troubleshooting dc motors on VCR decks and cassette loading units, CD players, camcorders, or any other consumer electronics product that uses a dc motor.

Thornley is an independent consumer electronics technician.

facturers have introduced three-phase synchronous motors. To drive such motors requires that the circuits in the product generate a three-phase electrical motor drive signal. The circuit converts a dc voltage into three separate, but related ac signals that are 120 degrees out of phase with each other. The effect of these three separate phase signals applied to the motor's windings is a rotating magnetic field that pulls the rotor around smoothly.

If one of these motors is not operating, or operating incorrectly, one diagnostic step is to observe the drive waveforms generated by the motor drive IC. If the motor windings show continuity, and these waveforms are not as specified by the manufacturer's service literature, it may be necessary to replace this IC.

A handy motor control box

If you encounter a dc motor that seems bad, an operational check with a known-good voltage supply may help to determine the motor's condition. See the accompanying box for one reader's advice on checking out dc motors. ■

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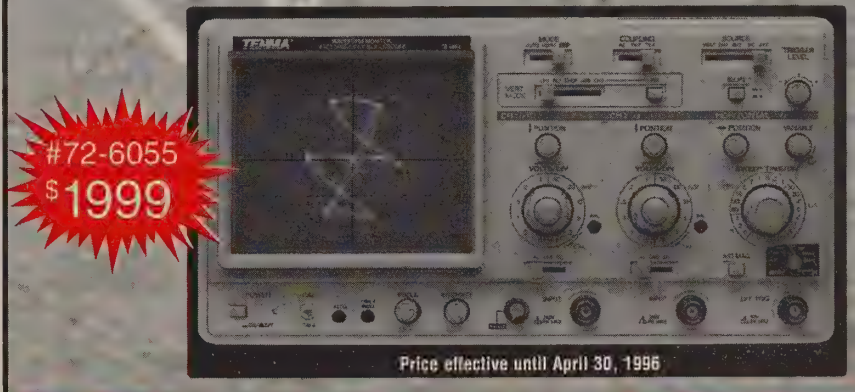

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A technician's glossary

The internet

By The ES&T Staff

Every profession has its own language. Outsiders sometimes feel that it's a way for insiders to keep the club away from them. There may be a measure of truth to that, but for the most part every profession simply deals with a lot of subject matter that those outside the profession have no interest in. Dealing with that subject matter requires a vocabulary of specialized words to describe it.

The vocabulary that a consumer electronics servicing technician requires is very specialized, very extensive, and becoming larger every day. As the makeup of consumer electronics changes and grows, the sheer number of words necessary to understand it changes and grows to keep pace. Moreover, as the tools and test equipment and other facilities required to perform consumer electronics service evolve and grow, the vocabulary required to describe that area also changes and grows accordingly.

For example, it's only in the relatively recent past that satellite TV, VCRs, projection TV, compact disk, and personal computers were added to the definition of consumer electronics. Technicians have had to learn a host of terms to be able to understand and describe these newcomers. Words like DOS and Windows, hard and floppy disks, the internet, came along with the computer. Terms such as head drum, VHS, head protrusion, and eye pattern were introduced along with the VCR.

For that reason, once a year, and sometimes more often, **ES&T** publishes a technician's glossary to try to provide a useful definition of some of the newer terms that might not be well understood.

These days, the internet is beginning to intrude into the lives of technicians, whether they like it or not. Technicians who service personal computers will invariably find their customers talking about their experiences on the 'net'. Technicians who wish to communicate via electronic mail, or use the internet for informational purposes will find themselves inundated with internet related terms. The terms that follow are some that we thought might be useful.

E-mail: Electronic mail. This feature of the internet and companies that provide access to it allows users to send mail electronically to any other internet user.

E-mail address: This is the series of letters and other characters that provide a unique address for internet users. As an example, the e-mail address for the editor of **ES&T** is cpersedit @aol.com. In this case, cpersedit is the name chosen by the editor (many other possible names were taken) the @ symbol means "at," and the aol.com means that the editor is being served by America OnLine (AOL), which is a commercial (.com) provider.

FTP: File transfer protocol. This is a method of transferring files between computers that are connected to the internet. Because this protocol is independent of the type of computer, or the type of operating system, any two computers can interchange files using this protocol, even if they are very dissimilar.

Home page: This is a presence on the internet that is available to anyone who can afford to contract with an internet provider for space on their computer, and who either has the skills to create such a home page, or who contracts with a company that provides the service of creating home pages. Actually, the computer space provided by the provider is surprisingly inexpensive. The cost of designing a home page may be very expensive. Many forward looking companies have home pages today. including many consumer electronics manufacturers and even a few consumer electronic service centers have home pages as an additional place where their potential customers can find information about the services they provide.

HTML: Hypertext markup language. This is the computer software language that is used to create hypertext.

Hypertext:: This is not limited to the internet, but is found on the internet, as well as any computer equipped with Windows, or other similar software. It's a form of text presented on the computer screen in which certain key words are highlighted. By moving the cursor to the highlighted words and clicking on a mouse button, the computer user can move to a range of subjects described by that key word. Each time the user clicks on a hypertext link word, he is presented with a new group of hypertext key words, usually including a link word that will get him back to the page he just left.

Internet: a network of computer networks throughout the world through which an individual who owns a computer and a modem, and has some form of access, can communicate and/or gather information on a virtually limitless range of subjects, anywhere in the world.

Service provider: Any company that has a large computer connected to the internet and offers commercially available connection via that computer to the internet. Many of these services are quite inexpensive and offer unlimited access to the internet for a flat monthly fee. Some of these providers also offer space on their computers where their clients may establish a home page.

We feel that this is such an important subject area that we will be bringing you more definitions and more information on the internet in the future. To give you some idea of how pervasive this method of communication is becoming, take a look at the "Literature" section in this issue. In that section we have listed home page information for two technical book publishers and a company that offers computer monitor service tips. That company now also has a home page that technicians can access in order to gather information and exchange service tips with other technicians. ■

Sometimes There's No Substitute For The Genuine Article...

As a member of today's professional electronics repair industry, we realize that you rely on our genuine replacement parts not only during the required warranty period, but also when you want the highest level of quality and performance.

Thomson Consumer Electronics' Authorized Parts Distributors can provide you with the replacement part which meets original specifications for RCA, GE and ProScan brand products.

RCA
PROSCAN
GE

Genuine Replacement *Parts*

Not only is Thomson a leader in producing quality Home Consumer Electronic products, but our most recent survey of the service industry shows the majority of you believe that **no other manufacturer** provided a consistently better parts fulfillment system than Thomson. We thank you very much.

As a result, quality parts and quality service combine to protect your reputation with your customers. Is anything more important to you?

Sometimes There is

SK *Series* **UNIVERSAL** *Parts*

We also realize that not every estimate can be converted to a repair using original parts, especially VCRs. Our growing line of low cost, high quality SK Series universal parts can help you convert more of those jobs and increase your profits. Whether you need video heads, idlers, gears, pulleys, tires, belts, pinch rollers, laser pickups, tool kits or exact semiconductors, you can look to SK Series.

We have parts for Panasonic, JVC, Sony, Zenith, Magnavox and most other brands...and you can get all these parts with one call to your Authorized Thomson SK Series Parts Distributor. What could be easier or more convenient?

For more information on the SK Series line of universal parts contact your Thomson Parts Distributor.

THOMSON CONSUMER ELECTRONICS
2000 Clements Bridge Road Deptford, NJ 08096-2088

Circle (116) on Reply Card

1996 Buyer's Guide

When it comes to finding the store that sells the products that they need, consumers have no problem. The newspapers feature ads every day that name the stores, describe the products they sell and detail what's on sale or being featured. The Yellow Pages also provide listings that let the consumer know where to go to buy the groceries, pick up some socks or a shirt and who's got gas and tires for the car.

Unfortunately, when a service center is looking for a replacement transistor for a TV that's sitting on the shelf, or a head drum for a VCR, or a new hard drive for a computer that a customer brought in for service, the local papers and yellow pages don't provide much help.

Of course, most service centers have a local distributor to turn to for most replacement parts, and to buy the badly-needed DMM or oscilloscope, but in many cases the distributor's stock is not comprehensive, and the service center has to look elsewhere to fulfill its needs.

Moreover, what happens when a service center decides to expand its business into a new area: for example a TV/VCR service center that decides to begin servicing microwave ovens, or compact disk players, or personal computers and peripherals? Where do they find listings that will tell them where they might find magnetrons, or replacement memory chips, or what companies provide such services as hard disk refurbishment or data recovery?

The ES&T Buyers' Guide

That's where the **ES&T** Buyers' Guide comes in. By maintaining constant contact with owners, service managers and technicians in consumer electronics service centers, we remain aware of the concerns of the service community: what kinds of products they're servicing and what parts seem to be hard to obtain. We also attend shows like the Electronic Distribution Show and Service Support Management, and additionally remain in frequent contact with the manufacturers, distributors and third and fourth party service providers in consumer electronics. By doing so, we're able to identify and contact the companies that manufacture and/or distribute the test equipment, replacement parts, services and information needed by service centers.

Once a year we send each of these companies a questionnaire that asks for their current address, telephone numbers, toll-free telephone numbers and fax numbers. In addition the questionnaire contains a list of products and services: test equipment, test equipment accessories, replacement parts and services; over one hundred separate items. We ask the recipients of the questionnaires to check the items that they offer.

Once all of this information is in, it is compiled by computer and the result is this annual Buyers' Guide. This year the listings contain the names, addresses and telephone numbers of over 700 manufacturers, distributors and service providers of interest to consumer electronics service centers, and over 6,000 individual listings, sorted by product, and by name of the companies that manufacture or distribute that product.

Save this issue. We get long-distance calls every day from readers who need an address. One look in the Buyers' Guide is usually all it takes to help them. If the caller had looked for themselves, they could have saved time and a toll call.

Using the Buyers' Guide

If you're in the market for a new DMM this year, you would probably know the names of some of the major DMM manufacturers, and you might have some of those companies' addresses somewhere in your files. Or maybe you would like to learn how to service computer disk drives, or compact disc players, but you have no idea who offers a course on that subject. If you figure the EIA is your source, you still have to figure out where to find that eternally misplaced address.

That's why we put together this Buyers' Guide—all the information you need is gathered together in one place. No need to search through stacks of papers. Here's your one-source alternative.

If you want a DMM turn to the Product Directory and look up DMMs. Every company that checked off DMMs on our questionnaire will be listed there, and every company's address will be listed in the Company Address Directory.

We've broken down this information into five categories:

-Product Directory..... page 19.
-Replacement Parts Components Direc tory ..... page 48.
-Association/Educational Sources Directory ..... page 54.
-Services Directory ..... page57.
-Company Address Directory ..... page 58.

Finding a product or part

We have subdivided the product directory according to certain types of products:

- Test equipment.
- Test equipment accessories.
- Circuit damage protective equipmentand supplies.
- Supplies/accessories equipment.
- Audio and video accessories.
- Tools.

For example, if you are looking for a VCR test jig kit, turn to the test equipment accessories section of the Product Directory. The companies listed there all say they offer test jig kits. If the company name is followed by a *D, that tells you this company is a distributor, not a manufacturer, of that product.

You will notice that certain company names are in color. Those companies have advertised in this issue. If you want to learn a little more about that company, turn to the page number listed to the far right. The ad alone might give you enough information to help you decide.

Once you know who you want to contact for more information, turn to the Company Address Directory. The address, telephone number and fax number for each company are listed there. (Of course, if the company you are interested in has advertised in this issue, you can just pull out your Reader Service card and circle the reply number listed under the advertisement.)

The Replacement Parts/Components Directory works the same way. Just look up the type of component you need, then turn to the Company Address Directory to find out how to contact a company that supplies that product. The Company Address Directory lists information on more than 700 companies and associations that offer products or services for the electronics servicer.

Checking out services

Consult the Services Directory if you need to contact a consultant, get a disk drive or head refurbished, plug into an on-line service, find a company to repair or rework a PC board, rent or lease equipment, calibrate your older test equipment, or repair a tuner.

Your source for continuing education

The Association/Educational Sources Directory helps you find books, schools and training seminars for continuing your electronics servicing education. It also points you toward sources for service literature and schematics for the products you service. Finally, it lists those companies that produce service management software systems that can help you run your business.

Keep in touch

Although the annual Buyers' Guide is a year in the making, we realize it can't be absolutely complete—companies are always starting up, going out of business, or moving. And technology keeps adding new products to track. If you know of a company that you think other readers should be aware of, or if you would like us to extend our coverage to new product areas, drop us a line.

If you become aware that a company listed has changed its address or telephone number, please let us know. Of course, if you find a mistake, please contact us immediately. We'll publish a correction in the first available issue that we can get it into. ■

Product Directory

Note: An entry followed by *D means that this company is a distributor, not a manufacturer. An entry followed by a *M/D means that this company is both a manufacturer and a distributor.

A line listing that is in color indicates that the company has an ad in this issue. The number following the listing is the number of the page on which the ad is located. BC means Back Cover. IBC means Inside Back Cover, the IFC means Inside Front Cover.

Test equipment

AC LEAKAGE TESTERS

See Adv. Page

Accutest Instruments, Inc.*D
AEMC Instruments
Alfa Electronics*D
American Reliance
AVO International
Vance Baldwin Inc.*D
BAPCO Bowden's Automated Prods
B&K Precision.....5
Bursma Electronic Distrib.*D
Computer Component Source*D
Consolidated Electronics, Inc.*D
Contact East*D
The Current Source*D
East Coast Transistor*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electronics Warehouse Corp.*D
Fotronic Corporation*D
Fox International*D
Herman Electronics*D.....11
Instek Corp.*D
Joseph Electronics*D
L-Com Inc.
Marshall Industries*D
M.A.T. Electronics*D.....74
MCM Electronics*D.....15
Omnitron Electronics*D
Philips Consumer Electronics*M/D
Print Products International*D
RAG Electronics Inc.*D
RS Electronics*D
Sencore ElectronicsIBC
Simpson Electronic Company
Snap-On Incorporated
Techni-Tool, Inc.*D
TIF Instruments, Inc.
Time Motion Tools*D
Tucker Electronics Co.
Union Electronics*D
Wavetek Corporation.....3
Wholesale Electronics Inc.*D
Yokogawa Corp. of America

AUTOMATED TEST EQUIPMENT

See Adv. Page

Acme Electric Corporation
AEMC Instruments
Allied Electronics, Inc.*D
American Reliance
Aristo Computers, Inc.
AT&T Capital Corporation*D
Vance Baldwin Inc.*D
BAPCO Bowden's Automated Prods
B&K Precision.....5
Brian Instruments, Inc.
Bursma Electronic Distrib.*D
Computer Component Source*D
Computer Svcs of America*D
CSTS Inc.
East Coast Transistor*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electro-Metrics, Incorporated
Electronic Prod. Specialties*D
Elgar Corp.
Fotec Inc
Fotronic Corporation*D
GlobeTech International, Inc.
Fox International*D
Hi-Techniques, Inc.
Hy-Tronix Instruments, Inc.
Joseph Electronics*D
Kelvin Electronics*D
Kester Solder
Leader Instruments Corp. 1
Marshall Industries*D
National Instruments
Omega Engineering, Inc.
Omnitron Electronics*D
PC Instruments Incorporated
Philips Consumer Electronics*M/D
Print Products International*D
Racal Instruments Inc.
RNJ Electronics Inc.*D.....52
Schlumberger Technologies
Snap-On Incorporated
Techni-Tool, Inc.*D
Tektronix, Inc.
Tektronix Test & Meas. Group
Time Motion Tools*D
Trompeter Electronics
Union Electronics*D

BREAKOUT BOXES

See Adv. Page

Accutest Instruments, Inc.*D
Arrow Electronics
Atrix, Inc.*D
B&B Electronics Manufacturing
Vance Baldwin Inc.*D
B-B&W Electronics*D
Benedict Computer
Bursma Electronic Distrib.*D
Colorado Spectrum, Inc.
Computer Svcs of America*D
Contact East*D
The Current Source*D
Dalco Electronics*D
Datatran Corp.
East Coast Transistor*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electro Standards Lab, Inc.
Electronics Warehouse Corp.*D
Electronix Corp.*D
Electronix Express*D
Frederick Engineering, Inc.
Harco Electronics*D
Heath Company
HMC - Hub Material Co.*D
Hosfelt Electronics, Inc.*D
Innovative Solutions
International Disk Svcs, Inc.
Jameco Electrncs Components*D
JDR Micro*D
W.S. Jenks & Son*D
Jim-Pak*D
Joseph Electronics*D
Kasco Distributing*D
Kelvin Electronics*D
L-Com Inc.
MAI/Prime Parts*D
Marshall Industries*D
M-Test Equipment
Omnitron Electronics*D
Print Products International*D
RNJ Electronics Inc.*D.....52
RS Electronics*D
Specialized Prods Company*D
Techni-Tool, Inc.*D
Time Motion Tools*D
Tucker Electronics Co.
Union Electronics*D
Wavetek Corporation.....3
Wholesale Electronics Inc.*D

CELLULAR TELEPHONE TEST EQUIPMENT

See Adv. Page

Accutest Instruments, Inc.*D
Advanced Electronic Application
AT&T Capital Corporation*D
Vance Baldwin Inc.*D
Bird Electronics Corp.
B&K Precision.....5
Consolidated Electronics, Inc.*D
The Current Source*D
East Coast Transistor*D
Eiger Electronics*D
Electronics Warehouse Corp.*D
Fox International*D
Harco Electronics*D
Herman Electronics*D.....11
Joseph Electronics*D
Keithley Instruments
Marconi Instruments
MCM Electronics*D15
Omnitron Electronics*D
Print Products International*D
Racal Instruments Inc.
Schlumberger Technologies
Sony Service Co.
Techni-Tool, Inc.*D
Tektronix, Inc.
Telogy*D
Union Electronics*D
Wavetek Corporation.....3

CONTINUITY TESTERS

See Adv. Page

Accutest Instruments, Inc.*D
AEMC Instruments
Allied Electronics, Inc.*D
Amprobe Instrument
Atrix, Inc.*D
AT&T Capital Corporation*D
AVO International
Vance Baldwin Inc.*D
BAPCO Bowden's Automated Prods
B-B&W Electronics*D
Behlman Electronics
Bel Merit Corporation
Brunelle Instruments, Inc.
Bursma Electronic Distrib.*D
C&S Sales*D
Computer Component Source*D
Consolidated Electronics, Inc.*D
Contact East*D
CSTS Inc.
The Current Source*D
Dalbani Corporation*D.....77
Dalco Electronics*D
Datatran Corp.
Desco Industries, Inc.
East Coast Transistor*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electro Tool, Inc.
Electronics Warehouse Corp.*D
Electronix Corp.*D
Fieldpiece Instruments
Foley-Belsaw*D
GC Electronics*D
Global Micro-Parts Depot*D
Harco Electronics*D
Herman Electronics*D.....11
HMC - Hub Material Co.*D
Hy Tec Dealer Service
Instek Corp.*D
Jameco Electronics Components*D
JDR Micro*D
W.S. Jenks & Son*D
Joseph Electronics*D
Kelvin Electronics*D
Klein Tools, Inc.
L-Com Inc.
L'il Bitty Tester
MAI/Prime Parts*D
Marshall Industries*D
M.A.T. Electronics*D.....74
Mouser Electronics*D
Omega Engineering, Inc.
Omnitron Electronics*D
Parts Express*D.....53
Philips Consumer Electronics*M/D
Philips ECG
Print Products International*D
Progressive Electronics
Protek
RAG Electronics Inc.*D
RNJ Electronics Inc.*D.....52
RS Electronics*D
Simpson Electronic Company
Specialized Prods Company*D
Techni-Tool, Inc.*D
TIF Instruments, Inc.
Time Motion Tools*D
Union Electronics*D
Weidmuller Inc.
Wholesale Electronics Inc.*D

CRT TESTERS/RESTORERS

See Adv. Page

Vance Baldwin Inc.*D
B-B&W Electronics*D
B&K Precision.....5
Bursma Electronic Distrib.*D
Computer Component Source*D
Computer Svcs of America*D
Compuvideo
Consolidated Electronics, Inc.*D
Contact East*D
Conway Engineering, Inc.
The Current Source*D
Dandy Mfg. Co.
East Coast Transistor*D
Eiger Electronics*D
Electronic Parts Supply*D
Electronics Warehouse Corp.*D
Fox International*D
Herman Electronics*D.....11
HMC - Hub Material Co.*D
W.S. Jenks & Son*D
Joseph Electronics*D
MCM Electronics*D.....15
Omnitron Electronics*D
Parts Express*D.....53
Philips Consumer Electronics*M/D

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Philips ECG
Print Products International*D
RNJ Electronics Inc.*D 52
Sencore Electronics .....IBC
Sony Service Co.
A.G. Tannenbaum*D
Techni-Tool, Inc.*D
Time Motion Tools*D
Tritronics, Inc.*D
Union Electronics*D
Wholesale Electronics Inc.*D

CURVE TRACERS

Accutest Instruments, Inc.*D
Allied Electronics, Inc.*D
Vance Baldwin Inc.*D
Bursma Electronic Distrib.*D
Computer Component Source*D
Computer Svcs of America*D
The Current Source*D
East Coast Transistor*D
Eiger Electronics*D
Electronics Warehouse Corp.*D
Fotronic Corporation*D
Hameg Instruments, Inc.
IET Labs, Inc.
Joseph Electronics*D
Key Tek Instrument Corp.
Leader Instruments Corp. 1
MAI/Prime Parts*D
Marshall Industries*D
MCM Electronics*D 15
Omega Engineering, Inc.
Omnitron Electronics*D
Philips Consumer Electronics*M/D
Print Products International*D
RAG Electronics Inc.*D
RNJ Electronics Inc.*D 52
Herman H. Sticht Co., Inc.*D
Tektronix Test & Meas. Group
Time Motion Tools*D
Tucker Electronics Co.
Union Electronics*D

DATA COMMUNICATION ANALYZERS/MONITORS/ TESTERS

Accutest Instruments, Inc.*D
Advanced Electronic Applicatio
Atrix, Inc.*D
AT&T Capital Corporation*D
B&B Electronics Manufacturing
Vance Baldwin Inc.*D
Benedict Computer
B&K Precision.....5
Bursma Electronic Distrib.*D
Contact East*D
Conway Engineering, Inc.
The Current Source*D
Datatran Corp.
Digitech Industries Inc.
East Coast Transistor*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electro Standards Lab, Inc.
Electro-Metrics, Incorporated
Electronics Warehouse Corp.*D
Extech Instruments Corp.*D.....73
Fieldpiece Instruments
Fluke CorporationBC
Fotec Inc
Fotronic Corporation*D
Frederick Engineering, Inc.
Harco Electronics*D
HMC - Hub Material Co.*D
International Disk Svcs, Inc.
Jameco Electronics Components*D
JDR Micro*D

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W.S. Jenks & Son*D
Joseph Electronics*D
Kasco Distributing*D
MAI/Prime Parts*D
Marshall Industries*D
M-Test Equipment
Omega Engineering, Inc.
Omnitron Electronics*D
Philips Consumer Electronics*M/D
Print Products International*D
Racal Instruments Inc.
RNJ Electronics Inc.*D 52
RS Electronics*D
Schlumberger Technologies
Sencore Electronics .....IBC
Simpson Electronic Company
Sony Service Co.
Specialized Prods Company*D
Techni-Tool, Inc.*D
Tektronix, Inc.
Tektronix Test & Meas. Group
Telogy*D
Time Motion Tools*D
Trompeter Electronics
Tucker Electronics Co.
Union Electronics*D
Wavetek Corporation.....3
Wholesale Electronics Inc.*D

DISC DRIVE ANALYZERS/TESTERS

Accurite Technologies Inc.....53
Analogic Corp.
AT&T Capital Corporation*D
AVA Instrumentation, Inc.
Brian Instruments, Inc.
Bursma Electronic Distrib.*D
Computer Doctors
Computer Svcs of America*D
Contact East*D
Data Depot, Inc.
Eiger Electronics*D
Fox International*D
HMC - Hub Material Co.*D
JDR Micro*D
W.S. Jenks & Son*D
Kenwood U.S.A. Corp.
Leader Instruments Corp. 1
Marshall Industries*D
Omnitron Electronics*D
Pioneer Research
Print Products International*D
RAG Electronics Inc.*D
Sony Service Co.
Tech Assist, Inc.
Techni-Tool, Inc.*D
Time Motion Tools*D
Union Electronics*D

DISTORTION ANALYZERS

Accutest Instruments, Inc.*D
AEMC Instruments
Allied Electronics, Inc.*D
AT&T Capital Corporation*D
Vance Baldwin Inc.*D
BMI-Basic Measuring Instrument
Bursma Electronic Distrib.*D
East Coast Transistor*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electronics Warehouse Corp.*D
Fotronic Corporation*D
Fox International*D
Herman Electronics*D 11
Joseph Electronics*D
Leader Instruments Corp. 1
MCM Electronics*D 15
Omnitron Electronics*D
Philips Consumer Electronics*M/D

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Print Products International*D
RAG Electronics Inc.*D
Schlumberger Technologies
Herman H. Sticht Co., Inc.*D
A.G. Tannenbaum*D
Techni-Tool, Inc.*D
Tektronix Test & Meas. Group
Telogy*D
Time Motion Tools*D
Trompeter Electronics
Tucker Electronics Co.
Union Electronics*D

FREQUENCY COUNTERS

Accutest Instruments, Inc.*D
Alfa Electronics*D
Allied Electronics, Inc.*D
American Reliance
Arrow Electronics
Atrix, Inc.*D
AT&T Capital Corporation*D
Vance Baldwin Inc.*D
B-B&W Electronics*D
Bel Merit Corporation
B&K Precision.....5
Brunelle Instruments, Inc.
Bursma Electronic Distrib.*D
C&S Sales*D
Computer Svcs of America*D
Consolidated Electronics, Inc.*D
Contact East*D
The Current Source*D
Daetron
Dalbani Corporation*D 77
Digi-Key D*
East Coast Transistor*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electro Tool, Inc.
Electronic Parts Supply*D
Electronics Warehouse Corp.*D
Electronix Express*D
Elenco Electronics, Inc.
Fieldpiece Instruments
Fluke Corporation .....BC
Fotronic Corporation*D
Fox International*D
Global Specialties
Hameg Instruments, Inc.
Harco Electronics*D
Heath Company
Herman Electronics*D 11
HMC - Hub Material Co.*D
Instek Corp.*D
Jameco Electronics Components*D
JDR Micro*D
W.S. Jenks & Son*D
Joseph Electronics*D
Keithley Instruments
Kelvin Electronics*D
Kenwood U.S.A. Corp.
Leader Instruments Corp. 1
LG Precision
MAI/Prime Parts*D
Marconi Instruments
Marshall Industries*D
MCM Electronics*D 15
Mouser Electronics*D
Omnitron Electronics*D
Parts Express*D 53
Philips Consumer Electronics*M/D
Philips ECG
Print Products International*D
Protek
RAG Electronics Inc.*D
Ramsey Electronics Inc.
RNJ Electronics Inc.*D 52
RS Electronics*D
Salen Enterprises*D
Sencore Electronics .....IBC
Sibex, Inc.

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Simpson Electronic Company
Specialized Prods Company*D
Herman H. Sticht Co., Inc.*D
Sun Equipment Corporation
Tandy National Parts*D
A.G. Tannenbaum*D
Techni-Tool, Inc.*D
Tektronix Test & Meas. Group
Telogy*D
Time Motion Tools*D
Tucker Electronics Co.
Union Electronics*D
Vector-VID Inc.
Wavetek Corporation.....3
Wholesale Electronics Inc.*D

FUNCTION GENERATORS

Accutest Instruments, Inc.*D
Alfa Electronics*D
Allied Electronics, Inc.*D
American Reliance
Analogic Corp.
Arrow Electronics
AT&T Capital Corporation*D
Vance Baldwin Inc.*D
B-B&W Electronics*D
Bel Merit Corporation
B&K Precision.....5
Brunelle Instruments, Inc.
Bursma Electronic Distrib.*D
C&S Sales*D
Computer Component Source*D
Consolidated Electronics, Inc.*D
Contact East*D
The Current Source*D
Dalbani Corporation*D 77
Digi-Key D*
East Coast Transistor*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electro Tool, Inc.
Electronic Parts Supply*D
Electronics Warehouse Corp.*D
Electronix Express*D
Elenco Electronics, Inc.
Emulation Technology, Inc.
Fieldpiece Instruments
Fluke Corporation .....BC
Fotronic Corporation*D
Fox International*D
Global Specialties
Hameg Instruments, Inc.
Harco Electronics*D
Heath Company
Herman Electronics*D 11
HMC - Hub Material Co.*D
Instek Corp.*D
Jameco Electronics Components*D
JDR Micro*D
W.S. Jenks & Son*D
Joseph Electronics*D
Keithley Instruments
Kelvin Electronics*D
Kenwood U.S.A. Corp.
Leader Instruments Corp. 1
LG Precision
MAI/Prime Parts*D
Marshall Industries*D
M.A.T. Electronics*D 74
MCM Electronics*D 15
Omega Engineering, Inc.
Omnitron Electronics*D
Parts Express*D 53
PC Instruments Incorporated
Philips Consumer Electronics*M/D
Philips ECG
Print Products International*D
Protek
RAG Electronics Inc.*D
RNJ Electronics Inc.*D 52
RS Electronics*D

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Salen Enterprises*D
Sibex, Inc.
Simpson Electronic Company
Specialized Prods Company*D
Herman H. Sticht Co., Inc.*D
Sun Equipment Corporation
Tandy National Parts*D
Techni-Tool, Inc.*D
Tektronix Test & Meas. Group
Teledata Systems
Telogy*D
Tucker Electronics Co.
Union Electronics*D
Wavetek Corporation.....3
Wholesale Electronics Inc.*D

GAUGES: HEAD PROTRUSION/ SPRING TENSION/ STYLUS FORCE/OTHER

AudioVisual Inc.*D
Vance Baldwin Inc.*D
Dalbani Corporation*D 77
East Coast Transistor*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electronics Warehouse Corp.*D
HMC - Hub Material Co.*D
Hunter Products, Inc.
Jonard Industries Corp.
M.A.T. Electronics*D 74
Omega Engineering, Inc.
Omnitron Electronics*D
Philips Consumer Electronics*M/D
Print Products International*D
Techni-Tool, Inc.*D
Tentel.....13
UBM Corp
Union Electronics*D
Wavetek Corporation.....3

GENERATORS, AUDIO

Accutest Instruments, Inc.*D
Alfa Electronics*D
Allied Electronics, Inc.*D
AT&T Capital Corporation*D
AudioVisual Inc.*D
Vance Baldwin Inc.*D
B-B&W Electronics*D
Brunelle Instruments, Inc.
Bursma Electronic Distrib.*D
C&S Sales*D
Computer Component Source*D
Compuvideo
Consolidated Electronics, Inc.*D
The Current Source*D
East Coast Transistor*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electronics Warehouse Corp.*D
Electronix Express*D
Elenco Electronics, Inc.
Fieldpiece Instruments
Fotronic Corporation*D
Fox International*D
Heath Company
Instek Corp.*D
Jameco Electronics Components*D
W.S. Jenks & Son*D
Joseph Electronics*D
Kelvin Electronics*D
Kenwood U.S.A. Corp.
Kikusui International Corp.
Leader Instruments Corp. 1
MAI/Prime Parts*D
Marshall Industries*D
Multidyne
Parts Express*D 53
Philips Consumer Electronics*M/D
Philips ECG
Print Products International*D
Protek
RAG Electronics Inc.*D
RNJ Electronics Inc.*D . 52
RS Electronics*D
Salen Enterprises*D
Sencore Electronics .....IBC
Herman H. Sticht Co., Inc.*D
Tandy National Parts*D
A.G. Tannenbaum*D
Techni-Tool, Inc.*D
Tektronix, Inc.
Tucker Electronics Co.
Union Electronics*D
Vector-VID Inc.
Wholesale Electronics Inc.*D

GENERATORS, SIGNAL

Accutest Instruments, Inc.*D
Alfa Electronics*D
Allied Electronics, Inc.*D
Analogic Corp.
AT&T Capital Corporation*D
AudioVisual Inc.*D
Vance Baldwin Inc.*D
B-B&W Electronics*D
B&K Precision.....5
Brunelle Instruments, Inc.
Bursma Electronic Distrib.*D
C&S Sales*D
Computer Component Source*D
Compuvideo
Consolidated Electronics, Inc.*D
Contact East*D
The Current Source*D
Dalbani Corporation*D 77
Digi-Key D*
East Coast Transistor*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electronics Warehouse Corp.*D
Electronix Express*D
Elenco Electronics, Inc.
Emulation Technology, Inc.
Fieldpiece Instruments
Fluke Corporation .....BC
Fotronic Corporation*D
Fox International*D
Hameg Instruments, Inc.
Harco Electronics*D
Heath Company
HMC - Hub Material Co.*D
Instek Corp.*D
Jameco Electronics Components*D
JDR Micro*D
W.S. Jenks & Son*D
Joseph Electronics*D
Kelvin Electronics*D
Kikusui International Corp.
Leader Instruments Corp. 1
MAI/Prime Parts*D
Marconi Instruments
Marshall Industries*D
National Instruments
NCM Electronics
Omnitron Electronics*D
Parts Express*D 53
PC Instruments Incorporated
Philips Consumer Electronics*M/D
Philips ECG
Print Products International*D
Progressive Electronics
RAG Electronics Inc.*D
Ramsey Electronics Inc.
RNJ Electronics Inc.*D 52
RS Electronics*D
Salen Enterprises*D
Sibex, Inc.
Herman H. Sticht Co., Inc.*D
Sun Equipment Corporation
Tandy National Parts*D
A.G. Tannenbaum*D
Team Systems, Inc.
Techni-Tool, Inc.*D
Tektronix, Inc.
Tektronix Test & Meas. Group
Telogy*D
Tucker Electronics Co.
Union Electronics*D
Vector-VID Inc.
Wavetek Corporation.....3
Wholesale Electronics Inc.*D

GENERATORS, VIDEO

Accutest Instruments, Inc.*D
Alfa Electronics*D
Allied Electronics, Inc.*D
AudioVisual Inc.*D
Vance Baldwin Inc.*D
B-B&W Electronics*D
B&K Precision.....5
Brunelle Instruments, Inc.
Bursma Electronic Distrib.*D
Computer Component Source*D
Computer Svcs of America*D
Compuvideo
Consolidated Electronics, Inc.*D
The Current Source*D
East Coast Transistor*D
Eiger Electronics*D
Electronics Warehouse Corp.*D
Electronix Corp.*D
Elenco Electronics, Inc.
Fieldpiece Instruments
Fluke Corporation .....BC
Fotronic Corporation*D
Fox International*D
Heath Company
Jameco Electronics Components*D
W.S. Jenks & Son*D
Joseph Electronics*D
Kelvin Electronics*D
Leader Instruments Corp. 1
MAI/Prime Parts*D
Marshall Industries*D
Multidyne
NCM Electronics
Network Technologies Inc.
Omnitron Electronics*D
Parts Express*D 53
PC Instruments Incorporated
Philips Consumer Electronics*M/D
Philips ECG
Print Products International*D
Protek
RAG Electronics Inc.*D
RNJ Electronics Inc.*D 52
RS Electronics*D
Salen Enterprises*D
Sencore Electronics .....IBC
Sirius Technologies
Sun Equipment Corporation
Team Systems, Inc.
Techni-Tool, Inc.*D
Tektronix, Inc.
Tucker Electronics Co.
Ultech Corp
Union Electronics*D
Wholesale Electronics Inc.*D

HV PROBES

Accutest Instruments, Inc.*D
Alfa Electronics*D
Allied Electronics, Inc.*D
Amprobe Instrument
Vance Baldwin Inc.*D
B-B&W Electronics*D
B&K Precision... 5
BMI-Basic Measuring Instrument
Brunelle Instruments, Inc.
Bursma Electronic Distrib.*D
Computer Component Source*D
Consolidated Electronics, Inc.*D
The Current Source*D
Digi-Key D*
East Coast Transistor*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electro-Metrics, Incorporated
Electronic Design Specialists
Electronics Warehouse Corp.*D
Electronix Express*D
Fieldpiece Instruments
Fotronic Corporation*D
Fox International*D
Hameg Instruments, Inc.
Harco Electronics*D
Herman Electronics*D 11
W.S. Jenks & Son*D
Joseph Electronics*D
Kelvin Electronics*D
MAI/Prime Parts*D
Marshall Industries*D
M.A.T. Electronics*D 74
Omnitron Electronics*D
Philips Consumer Electronics*M/D
Philips ECG
Polaris Div. of UXL Corp.
Print Products International*D
RAG Electronics Inc.*D
RNJ Electronics Inc.*D 52
RS Electronics*D
Sencore Electronics .....IBC
Specialized Prods Company*D
A.G. Tannenbaum*D
Techni-Tool, Inc.*D
Tektronix Test & Meas. Group
Test Probes, Inc.
Union Electronics*D
Wholesale Electronics Inc.*D

LOGIC ANALYZERS: SIGNATURE/STATE

Accutest Instruments, Inc.*D
Allied Electronics, Inc.*D
AT&T Capital Corporation*D
Vance Baldwin Inc.*D
Bitwise Designs Inc.
B&K Precision.....5
Bursma Electronic Distrib.*D
Computer Component Source*D
Consolidated Electronics, Inc.*D
Contact East*D
The Current Source*D
Dalbani Corporation*D 77
East Coast Transistor*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electronics Warehouse Corp.*D
Electronix Express*D
Emulation Technology, Inc.
Fotronic Corporation*D
Global Specialties
Fox International*D
Harco Electronics*D
Heath Company
Hitachi Denshi America Ltd.7
Hy-Tronix Instruments, Inc.
JDR Micro*D
W.S. Jenks & Son*D
Joseph Electronics*D
Leader Instruments Corp. 1
MAI/Prime Parts*D
Marshall Industries*D
MCM Electronics*D 15
Omnitron Electronics*D
Orion Instruments, Inc.
Philips Consumer Electronics*M/D
Print Products International*D

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RAG Electronics Inc.*D
RNJ Electronics Inc.*D 52
Schlumberger Technologies
Specialized Prods Company*D
Tandy National Parts*D
Techni-Tool, Inc.*D
Tektronix, Inc.
Tektronix Test & Meas. Group
Telogy*D
Total Power International
Tucker Electronics Co.
Union Electronics*D

LOGIC PROBES

Accutest Instruments, Inc.*D
Alfa Electronics*D
Allied Electronics, Inc.*D
American Design Components
Atrix, Inc.*D
AT&T Capital Corporation*D
Vance Baldwin Inc.*D
B-B&W Electronics*D
Bel Merit Corporation
B&K Precision.....5
Brunelle Instruments, Inc.
Bursma Electronic Distrib.*D
C&S Sales*D
Computer Component Source*D
Consolidated Electronics, Inc.*D
CSI/SPCCO
The Current Source*D
Dalbani Corporation*D 77
Data Depot, Inc.
Digi-Key D*
East Coast Transistor*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electronic Parts Supply*D
Electronics Warehouse Corp.*D
Electronix Express*D
Elenco Electronics, Inc.
Extech Instruments Corp.*D.....73
Foley-Belsaw*D
Fotronic Corporation*D
Global Specialties
Fox International*D
Harco Electronics*D
Heath Company
HMC - Hub Material Co.*D
Hy Tec Dealer Service
Instek Corp.*D
Instek Corp.*D
Jameco Electronics Components*D
JDR Micro*D
W.S. Jenks & Son*D
Joseph Electronics*D
Kelvin Electronics*D
Kenwood U.S.A. Corp.
Kobetron, Inc.
Leader Instruments Corp. 1
MAI/Prime Parts*D
Marshall Industries*D
MCM Electronics*D15
Micro 2000, Inc.
Mouser Electronics*D
Omnitron Electronics*D
Philips Consumer Electronics*M/D
Philips ECG
Print Products International*D
RAG Electronics Inc.*D
RNJ Electronics Inc.*D 52
Salen Enterprises*D
Specialized Prods Company*D
Techni-Tool, Inc.*D
Tektronix, Inc.
Tektronix Test & Meas. Group

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Union Electronics*D
Wavetek Corporation.....3
Wholesale Electronics Inc.*D

LOGIC PULSERS

Accutest Instruments, Inc.*D
Alfa Electronics*D
Vance Baldwin Inc.*D
B&K Precision.....5
Brunelle Instruments, Inc.
Bursma Electronic Distrib.*D
C&S Sales*D
Computer Component Source*D
Consolidated Electronics, Inc.*D
The Current Source*D
Digi-Key D*
East Coast Transistor*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electronic Parts Supply*D
Electronics Warehouse Corp.*D
Electronix Express*D
Elenco Electronics, Inc.
Fotronic Corporation*D
Fox International*D
HMC - Hub Material Co.*D
Hy Tec Dealer Service
Instek Corp.*D
Jameco Electronics Components*D
JDR Micro*D
W.S. Jenks & Son*D
Joseph Electronics*D
Kelvin Electronics*D
L'il Bitty Tester
Marshall Industries*D
Philips Consumer Electronics*M/D
Philips ECG
Print Products International*D
RAG Electronics Inc.*D
RNJ Electronics Inc.*D 52
Salen Enterprises*D
Specialized Prods Company*D
Techni-Tool, Inc.*D
Union Electronics*D
Wholesale Electronics Inc.*D

MAGNETRON TESTERS

Vance Baldwin Inc.*D
Computer Component Source*D
Eiger Electronics*D
Electronic Design Specialists
Fox International*D
W.S. Jenks & Son*D
Joseph Electronics*D
Omnitron Electronics*D
Print Products International*D
Q B Products*D
RNJ Electronics Inc.*D 52
Truminco of California Inc.*D
Union Electronics*D

METERS, CAPACITANCE/INDUCTANCE

Accutest Instruments, Inc.*D
Alfa Electronics*D
Allied Electronics, Inc.*D
American Design Components
American Reliance
Antique Electronic Supply*D
AT&T Capital Corporation*D
Vance Baldwin Inc.*D
B-B&W Electronics*D
Bel Merit Corporation
B&K Precision.....5
Brunelle Instruments, Inc.

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Bursma Electronic Distrib.*D
C&S Sales*D
Computer Component Source*D
Consolidated Electronics, Inc.*D
Contact East*D
Creative Electronics
CSI/SPCCO
The Current Source*D
Daetron
Dalbani Corporation*D 77
Digi-Key D*
East Coast Transistor*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electromatic Controls/
Electronic Design Specialists
Electronic Parts Supply*D
Electronics Warehouse Corp.*D
Electronix Express*D
Elenco Electronics, Inc.
Fieldpiece Instruments
Foley-Belsaw*D
Fotronic Corporation*D
Fox International*D
Global Micro-Parts Depot*D
Harco Electronics*D
Herman Electronics*D 11
HMC - Hub Material Co.*D
Hosfelt Electronics, Inc.*D
Hy Tec Dealer Service
IET Labs, Inc.
Instek Corp.*D
Jameco Electronics Components*D
JDR Micro*D
W.S. Jenks & Son*D
Joseph Electronics*D
Kelvin Electronics*D
Leader Instruments Corp. 1
MAI/Prime Parts*D
Marshall Industries*D
Omega Engineering, Inc.
Omnitron Electronics*D
Pacer Industries, Inc.
Parts Express*D 53
Philips Consumer Electronics*M/D
Philips ECG
Print Products International*D
Protek
RAG Electronics Inc.*D
RNJ Electronics Inc.*D 52
RS Electronics*D
Salen Enterprises*D
Sencore ElectronicsIBC
Specialized Prods Company*D
Herman H. Sticht Co., Inc.*D
Sun Equipment Corporation
Tandy National Parts*D
A.G. Tannenbaum*D
Techni-Tool, Inc.*D
Telogy*D
TIF Instruments, Inc.
Time Motion Tools*D
Total Power International
Truminco of California Inc.*D
Tucker Electronics Co.
Union Electronics*D
Universal Enterprises (UEI)
Wavetek Corporation.....3
Wholesale Electronics Inc.*D
Yokogawa Corp. of America

METERS, CLAMP ON

Accutest Instruments, Inc.*D
AEMC Instruments
Alfa Electronics*D
Amprobe Instrument
AT&T Capital Corporation*D
AVO International
Vance Baldwin Inc.*D
B-B&W Electronics*D
Bel Merit Corporation

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B&K Precision.....5
Brunelle Instruments, Inc.
Bursma Electronic Distrib.*D
C&S Sales*D
Computer Component Source*D
Consolidated Electronics, Inc.*D
Contact East*D
CSI/SPCCO
The Current Source*D
Dalbani Corporation*D 77
Dranetz Technologies, Inc.
East Coast Transistor*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electro Tool, Inc.
Electromatic Controls/
Electro-Metrics, Incorporated
Electronics Warehouse Corp.*D
Electronix Express*D
Elenco Electronics, Inc.
Extech Instruments Corp.*D.....73
Fieldpiece Instruments
Fluke Corporation .....BC
Fotronic Corporation*D
Harco Electronics*D
Heath Company
Herman Electronics*D 11
HMC - Hub Material Co.*D
Hosfelt Electronics, Inc.*D
Hy Tec Dealer Service
Instek Corp.*D
ITT Pomona Electronics
Jameco Electronics Components*D
W.S. Jenks & Son*D
Jensen Tools, Inc.*D
Joseph Electronics*D
Kelvin Electronics*D
Leader Instruments Corp. 1
MAI/Prime Parts*D
Marshall Industries*D
Mouser Electronics*D
Omega Engineering, Inc.
Omnitron Electronics*D
Parts Express*D 53
Philips Consumer Electronics*M/D
Philips ECG
Print Products International*D
Protek
RAG Electronics Inc.*D
RNJ Electronics Inc.*D 52
RS Electronics*D
Salen Enterprises*D
Simpson Electronic Company
Specialized Prods Company*D
Sun Equipment Corporation
Techni-Tool, Inc.*D
TIF Instruments, Inc.
Time Motion Tools*D
Triplett Corp.
Truminco of California Inc.*D
Union Electronics*D
Universal Enterprises (UEI)
Wavetek Corporation.....3
Wholesale Electronics Inc.*D
Yokogawa Corp. of America

METERS, FIELD STRENGTH

Accutest Instruments, Inc.*D
Advanced Electronic Application
AEMC Instruments
Alfa Electronics*D
American Reliance
AT&T Capital Corporation*D
Vance Baldwin Inc.*D
Bird Electronics Corp.
Bursma Electronic Distrib.*D
Computer Component Source*D
Contact East*D
CSI/SPCCO
The Current Source*D
East Coast Transistor*D

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Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electro-Metrics, Incorporated
Electron Processing
Electronics Warehouse Corp.*D
Fieldpiece Instruments
Fotronic Corporation*D
Fox International*D
Harco Electronics*D
Herman Electronics*D 11
Hy Tec Dealer Service
Integrity Design & Research
W.S. Jenks & Son*D
Joseph Electronics*D
Kelvin Electronics*D
Leader Instruments Corp. 1
Omnitron Electronics*D
Philips Consumer Electronics*M/D
Print Products International*D
Q B Products*D
RNJ Electronics Inc.*D 52
RS Electronics*D
Sencore Electronics .....IBC
Smith Design
Snap-On Incorporated
Herman H. Sticht Co., Inc.*D
Sun Equipment Corporation
Techni-Tool, Inc.*D
Time Motion Tools*D
Truminco of California Inc.*D
Tucker Electronics Co.
Union Electronics*D
Wavetek Corporation 3

METERS, SIGNAL LEVEL

Accutest Instruments, Inc.*D
American Reliance
AT&T Capital Corporation*D
Vance Baldwin Inc.*D
Bursma Electronic Distrib.*D
C&S Sales*D
Channel Master
Computer Component Source*D
Contact East*D
CSI/SPCCO
The Current Source*D
Dalbani Corporation*D 77
East Coast Transistor*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electronics Warehouse Corp.*D
Electronix Express*D
Fieldpiece Instruments
Fotronic Corporation*D
Fox International*D
Harco Electronics*D
W.S. Jenks & Son*D
Joseph Electronics*D
Leader Instruments Corp 1
MAI/Prime Parts*D
Marshall Industries*D
Omega Engineering, Inc.
Omnitron Electronics*D
Philips Consumer Electronics*M/D
Prime Technology, Inc.
Print Products International*D
RAG Electronics Inc.*D
RNJ Electronics Inc.*D 52
RS Electronics*D
Sencore Electronics .....IBC
Simpson Electronic Company
Snap-On Incorporated
Herman H. Sticht Co., Inc.*D
Sun Equipment Corporation
Techni-Tool, Inc.*D
Tektronix, Inc.
Time Motion Tools*D
Tritronics, Inc.*D
Union Electronics*D
Wavetek Corporation 3

METERS, SOUND LEVEL

Accutest Instruments, Inc.*D
Alfa Electronics*D
Allied Electronics, Inc.*D
AT&T Capital Corporation*D
Vance Baldwin Inc.*D
Brunelle Instruments, Inc.
Bursma Electronic Distrib.*D
Computer Component Source*D
Consolidated Electronics, Inc.*D
Contact East*D
CSI/SPCCO
The Current Source*D
East Coast Transistor*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electronics Warehouse Corp.*D
Extech Instruments Corp.*D 73
Fieldpiece Instruments
Fox International*D
Harco Electronics*D
HMC - Hub Material Co.*D
Hunter Products, Inc.
W.S. Jenks & Son*D
Joseph Electronics*D
Marshall Industries*D
Omnitron Electronics*D
Pacer Industries, Inc.
Parts Express*D 53
Philips Consumer Electronics*M/D
Prime Technology, Inc.
Print Products International*D
RAG Electronics Inc.*D
RNJ Electronics Inc.*D 52
Simpson Electronic Company
Snap-On Incorporated
Techni-Tool, Inc.*D
Telogy*D
Time Motion Tools*D
Truminco of California Inc.*D
Tucker Electronics Co.
Union Electronics*D
Universal Enterprises (UEI)
Yokogawa Corp. of America

METERS, VOLTMETERS, AC

Accutest Instruments, Inc.*D
AEMC Instruments
Alfa Electronics*D
Allied Electronics, Inc.*D
American Design Components
American Reliance
Amprobe Instrument
Analogic Corp.
Antique Electronic Supply*D
Arrow Electronics
Atrix, Inc.*D
AT&T Capital Corporation*D
AVO International
Vance Baldwin Inc.*D
B-B&W Electronics*D
Bel Merit Corporation
B&K Precision.....5
BMI-Basic Measuring Instrument
Brunelle Instruments, Inc.
Bursma Electronic Distrib.*D
Computer Component Source*D
Consolidated Electronics, Inc.*D
Contact East*D
CSI/SPCCO
The Current Source*D
Dalbani Corporation*D 77
Digi-Key D*
Dranetz Technologies, Inc.
East Coast Transistor*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electro Tool, Inc.
Electromatic Controls/
Electronic Design Specialists
Electronic Parts Supply*D
Electronics Warehouse Corp.*D
Electronix Express*D
Extech Instruments Corp.*D 73
Fieldpiece Instruments
Fluke Corporation .....BC
Fotronic Corporation*D
Fox International*D
Galco Industrial Electronics*D
GC Electronics*D
Hameg Instruments, Inc.
Harco Electronics*D
Herman Electronics*D 11
HMC - Hub Material Co.*D
Hosfelt Electronics, Inc.*D
Hy Tec Dealer Service
Instek Corp.*D
Jameco Electronics Components*D
JDR Micro*D
W.S. Jenks & Son*D
Joseph Electronics*D
Keithley Instruments
Kelvin Electronics*D
Kenwood U.S.A. Corp.
Leader Instruments Corp. 1
MAI/Prime Parts*D
Marconi Instruments
Marshall Industries*D
M.A.T. Electronics*D 74
MCM Electronics*D 15
Omega Engineering, Inc.
Omnitron Electronics*D
Parts Express*D 53
Philips Consumer Electronics*M/D
Philips ECG
Prime Technology, Inc.
Print Products International*D
Protek
RAG Electronics Inc.*D
RNJ Electronics Inc.*D 52
RS Electronics*D
Salen Enterprises*D
Schlumberger Technologies
Sencore Electronics .....IBC
Simpson Electronic Company
Snap-On Incorporated
Specialized Prods Company*D
A.W. Sperry Instruments, Inc.
Start International*D
Herman H. Sticht Co., Inc.*D
Sun Equipment Corporation
Tandy National Parts*D
A.G. Tannenbaum*D
Techni-Tool, Inc.*D
Tegam Inc.
Tektronix, Inc.
Telogy*D
TIF Instruments, Inc.
Time Motion Tools*D
Total Power International
Triplett Corp.
Tritronics, Inc.*D
Tucker Electronics Co.
Union Electronics*D
Universal Enterprises (UEI)
Wavetek Corporation 3
WestCon Div. of Syscon Corp.
Wholesale Electronics Inc.*D
Yokogawa Corp. of America

METERS, WOW AND FLUTTER

Accutest Instruments, Inc.*D
Alfa Electronics*D
Arrow Electronics
Vance Baldwin Inc.*D
Brunelle Instruments, Inc.
Bursma Electronic Distrib.*D
Computer Component Source*D
East Coast Transistor*D
Eiger Electronics*D
Electronics Warehouse Corp.*D
Fotronic Corporation*D
Hameg Instruments, Inc.
Herman Electronics*D 11
Instek Corp.*D
W.S. Jenks & Son*D
Joseph Electronics*D
Kenwood U.S.A. Corp.
Kikusui International Corp.
Leader Instruments Corp. 1
Marshall Industries*D
MCM Electronics*D 15
Omnitron Electronics*D
Philips Consumer Electronics*M/D
Print Products International*D
RAG Electronics Inc.*D
RNJ Electronics Inc.*D 52
Herman H. Sticht Co., Inc.*D
Sun Equipment Corporation
Techni-Tool, Inc.*D
Tucker Electronics Co.
Union Electronics*D

MICROWAVE LEAKAGE TESTERS

Accutest Instruments, Inc.*D
Allied Electronics, Inc.*D
Arrow Electronics
Vance Baldwin Inc.*D
B-B&W Electronics*D
Bursma Electronic Distrib.*D
Computer Component Source*D
Consolidated Electronics, Inc.*D
Dalbani Corporation*D 77
Eiger Electronics*D
Electronics Warehouse Corp.*D
Fotronic Corporation*D
Global Micro-Parts Depot*D
W.S. Jenks & Son*D
Joseph Electronics*D
MAI/Prime Parts*D
Marshall Industries*D
MCM Electronics*D 15
Omnitron Electronics*D
Parts Express*D 53
Print Products International*D
Q B Products*D
RAG Electronics Inc.*D
RNJ Electronics Inc.*D 52
Simpson Electronic Company
A.W. Sperry Instruments, Inc.
Tandy National Parts*D
Techni-Tool, Inc.*D
Tritronics, Inc.*D
Union Electronics*D
Wholesale Electronics Inc.*D

MULTIMETERS: ANALOG/DIGITAL

Accutest Instruments, Inc.*D
AEMC Instruments
Alfa Electronics*D
Allied Electronics, Inc.*D
American Reliance
Amprobe Instrument
Analogic Corp.
Arrow Electronics
Atrix, Inc.*D
AT&T Capital Corporation*D
AVO International
Vance Baldwin Inc.*D
B-B&W Electronics*D
Bel Merit Corporation
B&K Precision.....5
BMI-Basic Measuring Instrument
Brilliant King, Inc.
Brunelle Instruments, Inc.
Bursma Electronic Distrib.*D
C&S Sales*D
Computer Component Source*D

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Computer Svcs of America*D
Consolidated Electronics, Inc.*D
Contact East*D
CSI/SPCCO
The Current Source*D
Daetron
Dalbani Corporation*D 77
Dalco Electronics*D
Digi-Key D*
East Coast Transistor*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electro Tool, Inc.
Electromatic Controls/
Electronic Design Specialists
Electronic Prod. Specialties*D
Electronic Parts Supply*D
Electronics Warehouse Corp.*D
Elenco Electronics, Inc.
Extech Instruments Corp.*D.....75
Fieldpiece Instruments
Fluke Corporation .....BC
Foley-Belsaw*D
Fotronic Corporation*D
Fox International*D
Galco Industrial Electronics*D
Global Specialties
Hameg Instruments, Inc.
Harco Electronics*D
Heath Company
Herman Electronics*D 11
HMC - Hub Material Co.*D
Hy Tec Dealer Service
Instek Corp.*D
Jameco Electronics Components*D
JDR Micro*D
W.S. Jenks & Son*D
Jensen Tools, Inc.*D
Joseph Electronics*D
Keithley Instruments
Kelvin Electronics*D
Kenwood U.S.A. Corp.
Leader Instruments Corp. 1
LG Precision
MAI/Prime Parts*D
Marshall Industries*D
MCM Electronics*D 15
Mouser Electronics*D
Omega Engineering, Inc.
Omnitron Electronics*D
Parts Express*D 53
PC Instruments Incorporated
Philips Consumer Electronics*M/D
Philips ECG
Print Products International*D
Protek
RAG Electronics Inc.*D
RNJ Electronics Inc.*D 52
RS Electronics*D
Salen Enterprises*D
Schlumberger Technologies
Simpson Electronic Company
Snap-On Incorporated
SAT/ A SPIRIG CO.
Specialized Prods Company*D
A.W. Sperry Instruments, Inc.
Start International*D
Sun Equipment Corporation
Tandy National Parts*D
A.G. Tannenbaum*D
Techni-Tool, Inc.*D
Tegam Inc.
Tektronix, Inc.
Tektronix Test & Meas. Group
Telogy*D
TIF Instruments, Inc.
Time Motion Tools*D
Total Power International
Triplett Corp.
Tritronics, Inc.*D
Trompeter Electronics
Truminco of California Inc.*D
Tucker Electronics Co.

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Union Electronics*D
Universal Enterprises (UEI)
Vector-VID Inc.
Wavetek Corporation 3
Wholesale Electronics Inc.*D
Yokogawa Corp. of America

OSCILLOSCOPES

Accutest Instruments, Inc.*D
Alfa Electronics*D
Allied Electronics, Inc.*D
Analogic Corp.
Arrow Electronics
AT&T Capital Corporation*D
Vance Baldwin Inc.*D
B-B&W Electronics*D
Bel Merit Corporation
B&K Precision.....5
Brunelle Instruments, Inc.
Bursma Electronic Distrib.*D
C&S Sales*D
Computer Component Source*D
Compuvideo
Consolidated Electronics, Inc.*D
Contact East*D
CSI/SPCCO
The Current Source*D
Dalbani Corporation*D 77
Digi-Key D*
East Coast Transistor*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electro Tool, Inc.
Electronic Prod. Specialties*D
Electronics Warehouse Corp.*D
Electronix Express*D
Elenco Electronics, Inc.
Emulation Technology, Inc.
Fieldpiece Instruments
Fluke Corporation .....BC
Fotronic Corporation*D
Fox International*D
Galco Industrial Electronics*D
Global Micro-Parts Depot*D
Global Specialties
Gould Instrument Systems Inc.
Hameg Instruments, Inc.
Harco Electronics*D
Heath Company
Herman Electronics*D 11
Hitachi Denshi America Ltd.....7
Hi-Techniques, Inc.
HMC - Hub Material Co.*D
Hosfelt Electronics, Inc.*D
Instek Corp.*D
Jameco Electronics Components*D
JDR Micro*D
W.S. Jenks & Son*D
Jensen Tools, Inc.*D
Joseph Electronics*D
Kelvin Electronics*D
Kenwood U.S.A. Corp.
Kikusui International Corp.
Leader Instruments Corp. 1
LG Precision
MAI/Prime Parts*D
Marshall Industries*D
M.A.T. Electronics*D 74
MCM Electronics*D 15
Mouser Electronics*D
Oldaker Corp.
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Tektronix Test & Meas. Group
Telogy*D
Tritronics, Inc.*D
Tucker Electronics Co.
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Warrantech Corp.
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AESI/Stedi Watt
Amprobe Instrument
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Vance Baldwin Inc.*D
Bursma Electronic Distrib.*D
Computer Component Source*D
Contact East*D
The Current Source*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electro Tool, Inc.
Electronics Warehouse Corp.*D
Fieldpiece Instruments
Fotronic Corporation*D
HMC - Hub Material Co.*D
W.S. Jenks & Son*D
Joseph Electronics*D
L-Com Inc.
Marshall Industries*D
Omnitron Electronics*D
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Print Products International*D
Schurter, Inc.
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Trompeter Electronics
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Wholesale Electronics Inc.*D
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Electronix Corp.*D
Electronix Express*D
Fotronic Corporation*D
GlobeTech International, Inc.
Harco Electronics*D
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Hosfelt Electronics, Inc.*D
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Jameco Electronics Components*D
JDR Micro*D
W.S. Jenks & Son*D
Joseph Electronics*D
Keithley Instruments
Key Tek Instrument Corp.
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MAI/Prime Parts*D
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DECADE BOXES: CAPACITANCE/INDUCTANCE/ RESISTANCE

Accutest Instruments, Inc.*D
Allied Electronics, Inc.*D
Arrow Electronics
Vance Baldwin Inc.*D
Brunelle Instruments, Inc.
Bursma Electronic Distrib.*D
C&S Sales*D
Computer Component Source*D
Consolidated Electronics, Inc.*D
The Current Source*D
Daetron
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electromatic Controls/
Electronics Warehouse Corp.*D
Electronix Express*D
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Fotronic Corporation*D
GC Electronics*D
Fox International*D
HMC - Hub Material Co.*D
Hosfelt Electronics, Inc.*D
IET Labs, Inc.
W.S. Jenks & Son*D
Joseph Electronics*D
Kenwood U.S.A. Corp.
MAI/Prime Parts*D
Marshall Industries*D
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Specialized Prods Company*D
A.G. Tannenbaum*D
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Hosfelt Electronics, Inc.*D
Hy-Tronix Instruments, Inc.
Innovative Solutions
ITT Pomona Electronics
Jameco Electronics Components*D
JDR Micro*D
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Jim-Pak*D
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Kelvin Electronics*D
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Techni-Tool, Inc.*D
Tektronix Test & Meas. Group
Time Motion Tools*D
Union Electronics*D
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Alfa Electronics*D
Allied Electronics, Inc.*D
American Reliance
Arrow Electronics
AT&T Capital Corporation*D
Vance Baldwin Inc.*D
BAPCO Bowden's Automated Prods
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W.S. Jenks & Son*D
Joseph Electronics*D
Omnitron Electronics*D
Philips Consumer Electronics*M/D
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Hosfelt Electronics, Inc.*D
Jameco Electronics Components*D
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A.G. Tannenbaum*D
Techni-Tool, Inc.*D
Union Electronics*D
Vector-VID Inc.
Wholesale Electronics Inc.*D

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Eiger Electronics*D
Electronic Parts Supply*D
Electronics Warehouse Corp.*D
Electronix Corp.*D
Foley-Belsaw*D
Fox International*D
Herman Electronics*D 11
Hitachi Home Electronics
Joseph Electronics*D
Marshall Industries*D
M.A.T. Electronics*D 74
MCM Electronics*D 15
Nippon Shokuhin Sangyo USA Ltd
Omnitron Electronics*D
Parts Express*D 53

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Philips Consumer Electronics*M/D
Philips ECG
RNJ Electronics Inc.*D 52
Sony Service Co.
Tentel 13
Tritronics, Inc.*D
Union Electronics*D

OTHER TEST EQUIPMENT ACCESSORIES

Accutest Instruments, Inc.*D
AESI/Stedi Watt
Allied Electronics, Inc.*D
Amprobe Instrument
Vance Baldwin Inc.*D
Bel Merit Corporation
B&K Precision.....5
Brian Instruments, Inc.
Bursma Electronic Distrib.*D
C&S Sales*D
Chicago Case Company
Computer Component Source*D
Consolidated Electronics, Inc.*D
Contact East*D
CRC Industries, Inc.
The Current Source*D
Dalbani Corporation*D 77
East Coast Transistor*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electro Standards Lab, Inc.
Electro-Metrics, Incorporated
Electron Processing
Electronic Parts Supply*D
Electronics Warehouse Corp.*D
Electronix Corp.*D
E-Z Hook
Fluke Corporation .....BC
Fotronic Corporation*D
Gemini Inc.
Fox International*D
Hameg Instruments, Inc.
Herman Electronics*D 11
HMC - Hub Material Co.*D
Hy-Tronix Instruments, Inc.
Innovative Solutions
Instek Corp.*D
ITT Pomona Electronics
Jameco Electronics Components*D
JDR Micro*D
W.S. Jenks & Son*D
Jensen Tools, Inc.*D
Joseph Electronics*D
Kenwood U.S.A. Corp.
Kester Solder
L-Com Inc.
MAI/Prime Parts*D
Marshall Industries*D
MCM Electronics*D 15
Mouser Electronics*D
National Instruments
Oldaker Corp.
Omnitron Electronics*D
Philips Consumer Electronics*M/D
Philips ECG
Premium Parts+ Electronics Co*D
Print Products International*D
Probe Master, Inc.
Protek
RAG Electronics Inc.*D
Ramsey Electronics Inc.
Republic Packaging Corp.
RNJ Electronics Inc.*D 52
RS Electronics*D
Schurter, Inc.
Sencore ElectronicsIBC
Simpson Electronic Company
Specialized Prods Company*D
Tandy National Parts*D
A.G. Tannenbaum*D

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Techni-Tool, Inc.*D
Tektronix, Inc.
Tentel 13
Time Motion Tools*D
Tritronics, Inc.*D
Ultech Corp
Union Electronics*D
Universal Enterprises (UEI)
Wavetek Corporation 3
Wholesale Electronics Inc.*D

Circuit damage protective equipment/supplies

GROUNDING SYSTEMS

Arrow Electronics
Atrix, Inc.*D
Vance Baldwin Inc.*D
Computer Component Source*D
Contact East*D
Controlled Power Co.
The Current Source*D
HMC - Hub Material Co.*D
W.S. Jenks & Son*D
Joseph Electronics*D
MAI/Prime Parts*D
RNJ Electronics Inc.*D 52
Static Prevention Inc.
Techni-Tool, Inc.*D
3M Electrical Specialties Div
Time Motion Tools*D
Union Electronics*D
Verite
Wescorp

POWER LINE MONITORS

Accutest Instruments, Inc.*D
Allied Electronics, Inc.*D
Arrow Electronics
Atrix, Inc.*D
AT&T Capital Corporation*D
Vance Baldwin Inc.*D
B&K Precision.....5
BMI-Basic Measuring Instrument
Brunelle Instruments, Inc.
Bursma Electronic Distrib.*D
Computer Component Source*D
Consolidated Electronics, Inc.*D
Contact East*D
Controlled Power Co.
The Current Source*D
Dranetz Technologies, Inc.
EFI Electronics Corporation
E.I.L. Instruments, Inc.*D
Electronic Specialists, Inc.
Electronics Warehouse Corp.*D
HMC - Hub Material Co.*D
Hosfelt Electronics, Inc.*D
JDR Micro*D
W.S. Jenks & Son*D
Joseph Electronics*D
MAI/Prime Parts*D
M.A.T. Electronics*D 74
MCM Electronics*D 15
Mendon Electronics Corp.
Parts Express*D 53
Perma Power Electronics, Inc.
PowerTronics
Print Products International*D
RNJ Electronics Inc.*D 52
RS Electronics*D
SL Waber, Inc.
Sola Electric
Specialized Prods Company*D
Superior Electric
Techni-Tool, Inc.*D

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Time Motion Tools*D
Tripp Lite
Union Electronics*D
Vector-VID Inc.
Wholesale Electronics Inc.*D

STANDBY POWER SYSTEMS

Accutest Instruments, Inc.*D
Acme Electric Corporation
AESI/Stedi Watt
Allied Electronics, Inc.*D
Alpha Technologies
American Design Components
Arrow Electronics
Vance Baldwin Inc.*D
Bursma Electronic Distrib.*D
Computer Component Source*D
Computer Power Inc.
Consolidated Electronics, Inc.*D
Controlled Power Co.
The Current Source*D
Digi-Key D*
Electronic Specialists, Inc.
Electronics Warehouse Corp.*D
Elgar Corp.
Harco Electronics*D
Herman Electronics*D 11
HMC - Hub Material Co.*D
Hosfelt Electronics, Inc.*D
Jameco Electronics Components*D
JDR Micro*D
W.S. Jenks & Son*D
Joseph Electronics*D
MAI/Prime Parts*D
Meirick, Inc.
Minuteman UPS
Parts Express*D 53
Perma Power Electronics, Inc.
Print Products International*D
RNJ Electronics Inc.*D 52
RS Electronics*D
SL Waber, Inc.
Sola Electric
Superior Electric
Sutton Designs, Inc.
Techni-Tool, Inc.*D
Tripp Lite
Tucker Electronics Co.
Union Electronics*D
Wholesale Electronics Inc.*D

SURGE/SPIKE PROTECTORS

Accutest Instruments, Inc.*D
AESI/Stedi Watt
Allied Electronics, Inc.*D
American Design Components
American Power Conversion Corp
Arrow Electronics
Atrix, Inc.*D
Vance Baldwin Inc.*D
B-B&W Electronics*D
Best Power
Bursma Electronic Distrib.*D
Computer Component Source*D
Computer Power Inc.
Computer Svcs of America*D
Consolidated Electronics, Inc.*D
Contact East*D
Controlled Power Co.
The Current Source*D
Dalbani Corporation*D 77
Dalco Electronics*D
Datatran Corp.
Delta Warranty
Digi-Key D*
East Coast Transistor*D
EFI Electronics Corporation
Eiger Electronics*D
E.I.L. Instruments, Inc.*D

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Electron Processing
Electronic Parts Supply*D
Electronic Specialists, Inc.
Electronics Warehouse Corp.*D
Electronix Express*D
Elgar Corp.
Excel Distributing*D
Fox International*D
GC Electronics*D
Geist Inc.
Harco Electronics*D
Herman Electronics*D 11
Hitachi Home Electronics
HMC - Hub Material Co.*D
Hosfelt Electronics, Inc.*D
International Power Tchnlgies
Jameco Electronics Components*D
JDR Micro*D
W.S. Jenks & Son*D
Jensen Tools, Inc.*D
Jim-Pak*D
Joseph Electronics*D
Kalglo Electronics Co., Inc.
MAI/Prime Parts*D
Marshall Industries*D
M.A.T. Electronics*D 74
MCG Electronics
MCM Electronics*D 15
Meirick, Inc.
Minuteman UPS
Mouser Electronics*D
Omega Engineering, Inc.
ORA Electronics
Panamax, Inc.
Parts Express*D 53
Perma Power Electronics, Inc.
Philips Consumer Electronics*M/D
Print Products International*D
RNJ Electronics Inc.*D 52
RS Electronics*D
Schurter, Inc.
Shape Electronics
SL Waber, Inc.
Sola Electric
Specialized Prods Company*D
Superior Electric
Sutton Designs, Inc.
Tandy National Parts*D
Techni-Tool, Inc.*D
Time Motion Tools*D
Tripp Lite
Tritronics, Inc.*D
Union Electronics*D
Verite
Wholesale Electronics Inc.*D

UNINTERRUPTIBLE POWER SUPPLIES

Accutest Instruments, Inc.*D
Acme Electric Corporation
AESI/Stedi Watt
Allied Electronics, Inc.*D
Alpha Technologies
American Design Components
American Power Conversion Corp
Arrow Electronics
AudioVisual Inc.*D
Vance Baldwin Inc.*D
B-B&W Electronics*D
Behlman Electronics
Best Power
Bursma Electronic Distrib.*D
Clary Corp.
Computer Component Source*D
Computer Power Inc.
Consolidated Electronics, Inc.*D
Contact East*D
Controlled Power Co.
The Current Source*D
Dalco Electronics*D

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Delta Warranty
Digi-Key D*
EFI Electronics Corporation
Electronic Specialists, Inc.
Electronics Warehouse Corp.*D
Electronix Express*D
Elgar Corp.
Fotronic Corporation*D
Galco Industrial Electronics*D
General Power Systems, Inc.
Harco Electronics*D
Herman Electronics*D 11
HMC - Hub Material Co.*D
Hosfelt Electronics, Inc.*D
ICS Inc., Electro-Pac Div.
International Power Tchnlgies
Jameco Electronics Components*D
JDR Micro*D
W.S. Jenks & Son*D
Joseph Electronics*D
MAI/Prime Parts*D
M.A.T. Electronics*D 74
MCM Electronics*D 15
Meirick, Inc.
Minuteman UPS
Perma Power Electronics, Inc.
Philips Consumer Electronics*M/D
Philtek Power Corp.
Print Products International*D
RNJ Electronics Inc.*D 52
RS Electronics*D
SL Waber, Inc.
Sola Electric
Specialized Prods Company*D
Staco Energy Products
Superior Electric
Sutton Designs, Inc.
Techni-Tool, Inc.*D
Tripp Lite
Tucker Electronics Co.
Union Electronics*D
Wholesale Electronics Inc.*D

VOLTAGE REGULATORS

Accutest Instruments, Inc.*D
Allied Electronics, Inc.*D
Arrow Electronics
AVO International
Vance Baldwin Inc.*D
Bursma Electronic Distrib.*D
Clary Corp.
Computer Component Source*D
Compuvideo
Contact East*D
Controlled Power Co.
The Current Source*D
Dalbani Corporation*D 77
Digi-Key D*
East Coast Transistor*D
E.I.L. Instruments, Inc.*D
Electronic Parts Supply*D
Electronic Specialists, Inc.
Electronics Warehouse Corp.*D
Electronix Express*D
Elgar Corp.
Galco Industrial Electronics*D
Harco Electronics*D
Herman Electronics*D 11
HMC - Hub Material Co.*D
Hosfelt Electronics, Inc.*D
Jameco Electronics Components*D
JDR Micro*D
W.S. Jenks & Son*D
Joseph Electronics*D
Kalglo Electronics Co., Inc.
Kelvin Electronics*D
MAI/Prime Parts*D
M.A.T. Electronics*D 74
MCM Electronics*D 15
Minuteman UPS
Mouser Electronics*D

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Omnitron Electronics*D
Perma Power Electronics, Inc.
Philips Consumer Electronics*M/D
Print Products International*D
RNJ Electronics Inc.*D 52
RS Electronics*D
Shape Electronics
SL Waber, Inc.
Snap-On Incorporated
Sola Electric
Staco Energy Products
Superior Electric
Time Motion Tools*D
Tripp Lite
Union Electronics*D
Wholesale Electronics Inc.*D

Electrostatic discharge protection

ANTISTATIC CHEMICALS

Aervo-Pacific Co.
Allied Electronics, Inc.*D
Atrix, Inc.*D
Vance Baldwin Inc.*D
B-B&W Electronics*D
Bursma Electronic Distrib.*D
Charleswater
Chemtronics.....IFC
Computer Component Source*D
Computer Svcs of America*D
Consolidated Electronics, Inc.*D
Contact East*D
The Current Source*D
Dalbani Corporation*D 77
Desco Industries, Inc.
Digi-Key D*
Dow U.S.A.
East Coast Transistor*D
Electronic Prod. Specialties*D
Electronic Parts Supply*D
Electronics Warehouse Corp.*D
Electronix Corp.*D
Electronix Express*D
Fox International*D
Galco Industrial Electronics*D
GC Electronics*D
Harco Electronics*D
Herman Electronics*D 11
HMC - Hub Material Co.*D
Hy Tec Dealer Service
JDR Micro*D
W.S. Jenks & Son*D
JIT Resources, Inc.
Joseph Electronics*D
Klein Tools, Inc.
MAI/Prime Parts*D
Marshall Industries*D
Miller-Stephenson Chemical Co.
Omnitron Electronics*D
Philips Consumer Electronics*M/D
Philips ECG
Print Products International*D
PROSTAT
RNJ Electronics Inc.*D 52
Rogers Anti-Static Chemicals
RS Electronics*D
Specialized Prods Company*D
Static Prevention Inc.
Stoner, Inc.
Syon Corporation
Tandy National Parts*D
Tech Spray, Inc.
Techni-Tool, Inc.*D
3M Electronic Prods Division
Time Motion Tools*D
Tritronics, Inc.*D
Union Electronics*D

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Wescorp
Wholesale Electronics Inc.*D

ANTISTATIC IONIZATION DEVICES

Atrix, Inc.*D
Vance Baldwin Inc.*D
Chapman Corporation
Charleswater
Computer Component Source*D
Computer Svcs of America*D
Contact East*D
The Current Source*D
Desco Industries, Inc.
E.I.L. Instruments, Inc.*D
Electronic Prod. Specialties*D
Harco Electronics*D
HMC - Hub Material Co.*D
W.S. Jenks & Son*D
JIT Resources, Inc.
Joseph Electronics*D
Marshall Industries*D
Omnitron Electronics*D
Print Products International*D
Richmond Static Control Svcs
RS Electronics*D
Semtronics Corp.
The Simco Co., Inc.
Static Prevention Inc.
Tandy National Parts*D
Techni-Tool, Inc.*D
Gregory Thomas Inc.
3M Electrical Specialties Div
3M Electronic Prods Division
Time Motion Tools*D
Union Electronics*D
Voltura Enterprises, Inc.
Wescorp

ANTISTATIC MATS/ BENCHTOPS/WRIST STRAPS/OTHERS

Allied Electronics, Inc.*D
Atrix, Inc.*D
Vance Baldwin Inc.*D
B-B&W Electronics*D
Bursma Electronic Distrib.*D
Charleswater
Clauss Electronics Div.
Computer Component Source*D
Computer Svcs of America*D
Contact East*D
The Current Source*D
Dalco Electronics*D
Desco Industries, Inc.
Digi-Key D*
E.I.L. Instruments, Inc.*D
Electro Tool, Inc.
Electronic Prod. Specialties*D
Electronics Warehouse Corp.*D
Electronix Corp.*D
Electronix Express*D
Elenco Electronics, Inc.
C.H. Ellis Company, Inc.
Fox International*D
Galco Industrial Electronics*D
The Granite Corp.
Harco Electronics*D
Herman Electronics*D 11
HMC - Hub Material Co.*D
Hosfelt Electronics, Inc.*D
ITT Pomona Electronics
Jameco Electronics Components*D
JDR Micro*D
W.S. Jenks & Son*D
Jim-Pak*D
JIT Resources, Inc.
Joseph Electronics*D

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Kasco Distributing*D
MAI/Prime Parts*D
Marshall Industries*D
Mouser Electronics*D
Omnitron Electronics*D
Parts Express*D 53
Philips Consumer Electronics*M/D
Philips ECG
Print Products International*D
PROSTAT
The Rex Company
Richmond Static Control Svcs
RNJ Electronics Inc.*D 52
RS Electronics*D
Semtronics Corp.
The Simco Co., Inc.
SAT/ A SPIRIG CO.
Sony Service Co.
Specialized Prods Company*D
Static Prevention Inc.
Tandy National Parts*D
Techni-Tool, Inc.*D
Teclab
Gregory Thomas Inc.
3M Electrical Specialties Div
3M Electronic Prods Division
Time Motion Tools*D
Trace Racks
Tritronics, Inc.*D
Union Electronics*D
Waldmann Lighting Company
Wescorp
Wholesale Electronics Inc.*D

ESD FLEXIBLE PACKAGING

Armand Mfg. Inc.
Atrix, Inc.*D
Vance Baldwin Inc.*D
Bursma Electronic Distrib.*D
Charleswater
Computer Component Source*D
Contact East*D
Desco Industries, Inc.
Digi-Key D*
Electronic Prod. Specialties*D
Electronics Warehouse Corp.*D
Galco Industrial Electronics*D
Global Kitting
Harco Electronics*D
HMC - Hub Material Co.*D
W.S. Jenks & Son*D
JIT Resources, Inc.
Joseph Electronics*D
MAI/Prime Parts*D
Marshall Industries*D
Omnitron Electronics*D
Print Products International*D
Republic Packaging Corp.
Richmond Static Control Svcs
RS Electronics*D
Seco Industries
Semtronics Corp.
The Simco Co., Inc.
Techni-Tool, Inc.*D
3M Electrical Specialties Div
3M Electronic Prods Division
Time Motion Tools*D
Union Electronics*D
Wescorp

STATIC DETECTION METERS

Accutest Instruments, Inc.*D
Allied Electronics, Inc.*D
Atrix, Inc.*D
Vance Baldwin Inc.*D
Bursma Electronic Distrib.*D
Chapman Corporation
Charleswater
Computer Component Source*D

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Computer Svcs of America*D
Contact East*D
The Current Source*D
Desco Industries, Inc.
Digi-Key D*
E.I.L. Instruments, Inc.*D
Electronic Prod. Specialties*D
Harco Electronics*D
HMC - Hub Material Co.*D
W.S. Jenks & Son*D
JIT Resources, Inc.
Joseph Electronics*D
Marshall Industries*D
Monroe Electronics, Inc.
Omnitron Electronics*D
Print Products International*D
PROSTAT
Richmond Static Control Svcs
RS Electronics*D
Semtronics Corp.
The Simco Co., Inc.
Specialized Prods Company*D
Tech Spray, Inc.
Techni-Tool, Inc.*D
Gregory Thomas Inc.
3M Electrical Specialties Div
3M Electronic Prods Division
Time Motion Tools*D
Union Electronics*D
Voltura Enterprises, Inc.
Wescorp
Wholesale Electronics Inc.*D

Supplies/ accessories equipment

BATTERIES

Acme Electric Corporation
Allied Electronics, Inc.*D
Alpha Technologies
Ambico
American Design Components
Amprobe Instrument
Andrews Electronics*D 47
Antique Electronic Supply*D
Arrow Electronics
Atrix, Inc.*D
AudioVisual Inc.*D
Avex Probes, Inc. (API)
Vance Baldwin Inc.*D
B-B&W Electronics*D
Bursma Electronic Distrib.*D
Cititronix/Panson*D
Computer Component Source*D
Compuvideo
Consolidated Electronics, Inc.*D
Contact East*D
The Current Source*D
Dalbani Corporation*D 77
Dalco Electronics*D
Digi-Key D*
East Coast Transistor*D
Eiger Electronics*D
Electronic Parts Supply*D
Electronics Warehouse Corp.*D
Electronix Express*D
Elenco Electronics, Inc.
Entech Corporation
Excel Distributing*D
Fox International*D
Galco Industrial Electronics*D
Harco Electronics*D
Herman Electronics*D 11
HMC - Hub Material Co.*D
Hosfelt Electronics, Inc.*D
JDR Micro*D
W.S. Jenks & Son*D

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Joseph Electronics*D
Kelvin Electronics*D
MAI/Prime Parts*D
Marshall Industries*D
M.A.T. Electronics*D 74
MCM Electronics*D 15
Mouser Electronics*D
NESCO Batteries
Omega Engineering, Inc.
Omnitron Electronics*D
ORA Electronics
Panasonic Industrial Co.
Parts Express*D 53
PC Service Source*D
Philips Consumer Electronics*M/D
Premium Parts+ Electronics Co*D
Print Products International*D
RNJ Electronics Inc.*D 52
RS Electronics*D
Sanyo Energy Corp.
Sony Service Co.
Specialized Prods Company*D
Tadiran Computer Batteries
Techni-Tool, Inc.*D
Time Motion Tools*D
Tritronics, Inc.*D
Union Electronics*D
Wholesale Electronics Inc.*D
Zenith Sales Co.

BENCHES/CABINETS

Allied Electronics, Inc.*D
Arrow Electronics
Vance Baldwin Inc.*D
Computer Svcs of America*D
Contact East*D
The Current Source*D
East Coast Transistor*D
E.I.L. Instruments, Inc.*D
Electronic Prod. Specialties*D
Fox International*D
Harco Electronics*D
Herman Electronics*D 11
HMC - Hub Material Co.*D
I.A.C. Industries
W.S. Jenks & Son*D
Jensen Tools, Inc.*D
Jim-Pak*D
JIT Resources, Inc.
Joseph Electronics*D
Lista International Corp.
Marshall Industries*D
M.A.T. Electronics*D 74
MCM Electronics*D 15
Parts Express*D 53
Philips Consumer Electronics*M/D
Print Products International*D
The Rex Company
RNJ Electronics Inc.*D 52
RS Electronics*D
Specialized Prods Company*D
Techni-Tool, Inc.*D
Teclab
Time Motion Tools*D
Union Electronics*D
Workplace Systems, Inc.
Zero Corp., East Div.

CHEMICALS

Allied Electronics, Inc.*D
Alternative Technical Services
Andrews Electronics*D 47
Antique Electronic Supply*D
Arrow Electronics
Atrix, Inc.*D
AudioVisual Inc.*D
Vance Baldwin Inc.*D
B-B&W Electronics*D
Bursma Electronic Distrib.*D

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CAIG Laboratories, Inc.....77
Chemtronics.....IFC
Cititronix/Panson*D
Computer Component Source*D
Computer Svcs of America*D
Consolidated Electronics, Inc.*D
Contact East*D
CRC Industries, Inc.
The Current Source*D
Dalbani Corporation*D 77
Dow U.S.A.
Dynaloy, Inc.
East Coast Transistor*D
Echelon Industries*D
Eiger Electronics*D
Electronic Prod. Specialties*D
Electronics Warehouse Corp.*D
Electronix Corp.*D
Electronix Express*D
Excel Distributing*D
Foley-Belsaw*D
Four Star Chemical
Fox International*D
Galco Industrial Electronics*D
GC Electronics*D
Global Micro-Parts Depot*D
Harco Electronics*D
Herman Electronics*D 11
HMC - Hub Material Co.*D
Hosfelt Electronics, Inc.*D
Hy Tec Dealer Service
Jameco Electronics Components*D
JDR Micro*D
W.S. Jenks & Son*D
Joseph Electronics*D
Klein Tools, Inc.
MAI/Prime Parts*D
Marshall Industries*D
M.A.T. Electronics*D 74
MCM Electronics*D 15
Micro Care Corp.
Miller-Stephenson Chemical Co.
Mouser Electronics*D
Multicore Solders
P.K. Neuses*D
Omega Engineering, Inc.
Parts Express*D 53
Philips Consumer Electronics*M/D
Philips ECG
Planned Products
Premium Parts+ Electronics Co*D
Print Products International*D
Rawn Co. Inc.
RNJ Electronics Inc.*D 52
Rogers Anti-Static Chemicals
RS Electronics*D
Sony Service Co.
Specialized Prods Company*D
Stoner, Inc.
Syon Corporation
Tandy National Parts*D
Tech Spray, Inc.
Techni-Tool, Inc.*D
The Texwipe Company/CleanTex
3M Electronic Prods Division
Tritronics, Inc.*D
Union Electronics*D
Union Electronics*D
Wholesale Electronics Inc.*D
Zenith Sales Co.

CLEANING SUPPLIES

Aervo-Pacific Co.
Allied Electronics, Inc.*D
Alternative Technical Services
Andrews Electronics*D.....47
Atrix, Inc.*D
AudioVisual Inc.*D
Vance Baldwin Inc.*D
CAIG Laboratories, Inc.....77

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Cititronix/Panson*D
Computer Component Source*D
Computer Svcs of America*D
Consolidated Electronics, Inc.*D
Contact East*D
CRC Industries, Inc.
The Current Source*D
Dalbani Corporation*D 77
Dalco Electronics*D
East Coast Transistor*D
Echelon Industries*D
Eiger Electronics*D
Electronic Prod. Specialties*D
Electronic Parts Supply*D
Electronics Warehouse Corp.*D
Electronix Corp.*D
Falcon Safety Products
Foley-Belsaw*D
Four Star Chemical
Fox International*D
Harco Electronics*D
Herman Electronics*D 11
HMC - Hub Material Co.*D
Hosfelt Electronics, Inc.*D
Hy Tec Dealer Service
Jameco Electronics Components*D
W.S. Jenks & Son*D
Joseph Electronics*D
Klein Tools, Inc.
Leland Ltd., Inc.
MAI/Prime Parts*D
Marshall Industries*D
M.A.T. Electronics*D 74
MCM Electronics*D 15
Micro Care Corp.
Miller-Stephenson Chemical Co.
Multicore Solders
P.K. Neuses*D
ORA Electronics
Parts Express*D 53
PC Service Source*D
Philips Consumer Electronics*M/D
Print Products International*D
Rawn Co. Inc.
RNJ Electronics Inc.*D 52
Rogers Anti-Static Chemicals
RS Electronics*D
Sony Service Co.
Specialized Prods Company*D
Start International*D
Stoner, Inc.
Syon Corporation
Tech Spray, Inc.
Techni-Tool, Inc.*D
The Texwipe Company/CleanTex
3M Consumer & Pro
Time Motion Tools*D
Tritronics, Inc.*D
Union Electronics*D
Wholesale Electronics Inc.*D

LAMPS

Allied Electronics, Inc.*D
Arrow Electronics
Atrix, Inc.*D
AudioVisual Inc.*D
Vance Baldwin Inc.*D
B-B&W Electronics*D
Bursma Electronic Distrib.*D
Computer Component Source*D
Computer Svcs of America*D
Consolidated Electronics, Inc.*D
Contact East*D
The Current Source*D
Dalbani Corporation*D 77
Dazor Manufacturing Corp.
Digi-Key D*
East Coast Transistor*D
E.I.L. Instruments, Inc.*D
Electronic Prod. Specialties*D
Electronics Warehouse Corp.*D

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Electronix Corp.*D
Electronix Express*D
Foley-Belsaw*D
Global Micro-Parts Depot*D
Fox International*D
Harco Electronics*D
Herman Electronics*D 11
HMC - Hub Material Co.*D
Hosfelt Electronics, Inc.*D
Jameco Electronics Components*D
Joseph Electronics*D
Kelvin Electronics*D
Luxo Corp.
MAI/Prime Parts*D
Marshall Industries*D
M.A.T. Electronics*D 74
MCM Electronics*D 15
Mouser Electronics*D
O.C. White
Parts Express*D 53
Premium Parts+ Electronics Co*D
Print Products International*D
RNJ Electronics Inc.*D 52
RS Electronics*D
Schurter, Inc.
Specialized Prods Company*D
Start International*D
Techni-Tool, Inc.*D
Teclab
Time Motion Tools*D
Tritronics, Inc.*D
Union Electronics*D
Waldmann Lighting Company
Wholesale Electronics Inc.*D

MAGNIFIERS

Allied Electronics, Inc.*D
Atrix, Inc.*D
Vance Baldwin Inc.*D
B-B&W Electronics*D
Bursma Electronic Distrib.*D
Computer Component Source*D
Consolidated Electronics, Inc.*D
Contact East*D
The Current Source*D
Dalbani Corporation*D 77
Dalco Electronics*D
Dazor Manufacturing Corp.
Digi-Key D*
East Coast Transistor*D
Edroy Products
Electro Tool, Inc.
Electronic Prod. Specialties*D
Electronics Warehouse Corp.*D
Electronix Corp.*D
Foley-Belsaw*D
Fox International*D
Harco Electronics*D
Herman Electronics*D 11
HMC - Hub Material Co.*D
Hosfelt Electronics, Inc.*D
Jameco Electronics Components*D
W.S. Jenks & Son*D
Joseph Electronics*D
Luxo Corp.
Marshall Industries*D
M.A.T. Electronics*D 74
MCM Electronics*D 15
O.C White Co.
Parts Express*D 53
Print Products International*D
RNJ Electronics Inc.*D 52
SAT/ A SPIRIG CO.
Specialized Prods Company*D
Start International*D
Tandy National Parts*D
Techni-Tool, Inc.*D
Teclab
Time Motion Tools*D
Union Electronics*D

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SHELVES/RACKS/BINS

Allied Electronics, Inc.*D
Arrow Electronics
Vance Baldwin Inc.*D
Clipper Products
Contact East*D
The Current Source*D
Electronic Prod. Specialties*D
Herman Electronics*D 11
HMC - Hub Material Co.*D
Hosfelt Electronics, Inc.*D
Hy Tec Dealer Service
Jameco Electronics Components*D
W.S. Jenks & Son*D
JIT Resources, Inc.
Joseph Electronics*D
Marshall Industries*D
MCM Electronics*D 15
Melmat Inc *D
Parts Express*D 53
Print Products International*D
The Rex Company
RNJ Electronics Inc.*D 52
RS Electronics*D
Snap-On Incorporated
Specialized Prods Company*D
Start International*D
Techni-Tool, Inc.*D
Teclab
Tektronix, Inc.
Time Motion Tools*D
Trace Racks
Union Electronics*D
Wholesale Electronics Inc.*D

SOLDER/DESOLDERING BRAID/FLUX

Allied Electronics, Inc.*D
American Design Components
Andrews Electronics*D.....47
Arrow Electronics
Atrix, Inc.*D
AudioVisual Inc.*D
Vance Baldwin Inc.*D
B-B&W Electronics*D
Bursma Electronic Distrib.*D
Chemtronics.....IFC
Cititronix/Panson*D
Computer Component Source*D
Consolidated Electronics, Inc.*D
Contact East*D
The Current Source*D
Dalco Electronics*D
Digi-Key D*
East Coast Transistor*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electro Tool, Inc.
Electronic Prod. Specialties*D
Electronic Parts Supply*D
Electronics Warehouse Corp.*D
Electronix Corp.*D
Electronix Express*D
Excel Distributing*D
Foley-Belsaw*D
Fox International*D
Galco Industrial Electronics*D
Global Micro-Parts Depot*D
Fox International*D
Harco Electronics*D
Herman Electronics*D 11
Hexacon Electric Co.
HMC - Hub Material Co.*D
Hosfelt Electronics, Inc.*D
Hy Tec Dealer Service
Internat'l Components Corp.*D
Jameco Electronics Components*D
JDR Micro*D
W.S. Jenks & Son*D

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Jim-Pak*D
Joseph Electronics*D
Kasco Distributing*D
Kelvin Electronics*D
Kester Solder
MAI/Prime Parts*D
Marshall Industries*D
M.A.T. Electronics*D 74
MCM Electronics*D 15
Mouser Electronics*D
Multicore Solders
Oldaker Corp.
Omnitron Electronics*D
Parts Express*D 53
Philips Consumer Electronics*M/D
Philips ECG
Plato Products, Inc.
Premium Parts+ Electronics Co*D
Print Products International*D
RNJ Electronics Inc.*D 52
RS Electronics*D
Sony Service Co.
Specialized Prods Company*D
Start International*D
Tandy National Parts*D
Tech Spray, Inc.
Techni-Tool, Inc.*D
Time Motion Tools*D
Tritronics, Inc.*D
Union Electronics*D
Wholesale Electronics Inc.*D

TUBING

Allied Electronics, Inc.*D
Arrow Electronics
Vance Baldwin Inc.*D
B-B&W Electronics*D
Bursma Electronic Distrib.*D
Channel Master
Consolidated Electronics, Inc.*D
The Current Source*D
East Coast Transistor*D
Eiger Electronics*D
Electro Insulation Corporation
Electronics Warehouse Corp.*D
Electronix Express*D
Fox International*D
Harco Electronics*D
Herman Electronics*D 11
Hosfelt Electronics, Inc.*D
W.S. Jenks & Son*D
Joseph Electronics*D
MAI/Prime Parts*D
Manhattan/CDT
MCM Electronics*D 15
M.M. Newman Corporation
Omega Engineering, Inc.
Parts Express*D 53
RNJ Electronics Inc.*D 52
RS Electronics*D
Specialized Prods Company*D
Techni-Tool, Inc.*D
Union Electronics*D
Wholesale Electronics Inc.*D

WIRE, CABLE AND ACCESSORIES

Allied Electronics, Inc.*D
American Design Components
Antique Electronic Supply*D
Arrow Electronics
AudioVisual Inc.*D
Vance Baldwin Inc.*D
B-B&W Electronics*D
Belden Wire & Cable Company
Bursma Electronic Distrib.*D
Channel Master

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Cititronix/Panson*D
Computer Component Source*D
Computer Svcs of America*D
Compuvideo
Consolidated Electronics, Inc.*D
Contact East*D
The Current Source*D
Dalbani Corporation*D 77
Dalco Electronics*D
Digi-Key D*
East Coast Transistor*D
Eiger Electronics*D
Electro Insulation Corporation
Electro Standards Lab, Inc.
Electronic Parts Supply*D
Electronics Warehouse Corp.*D
Electronix Corp.*D
Electronix Express*D
The Eraser Company, Wybar Div.
Excel Distributing*D
Fox International*D
Geist Inc.
Global Micro-Parts Depot*D
Harco Electronics*D
Herman Electronics*D 11
Hosfelt Electronics, Inc.*D
Internat'l Components Corp.*D
ITT Pomona Electronics
Jameco Electronics Components*D
JDR Micro*D
Jensen Tools, Inc.*D
Joseph Electronics*D
Kelvin Electronics*D
MAI/Prime Parts*D
Manhattan/CDT
M.A.T. Electronics*D 74
MCM Electronics*D1 5
Mouser Electronics*D
Oldaker Corp.
Omega Engineering, Inc.
Omnitron Electronics*D
ORA Electronics
Parts Express*D 53
Premium Parts+ Electronics Co*D
RNJ Electronics Inc.*D 52
RS Electronics*D
Support Systems International
Tandy National Parts*D
Techni-Tool, Inc.*D
3M Electronic Prods Division
Time Motion Tools*D
Tritronics, Inc.*D
Union Electronics*D
Wholesale Electronics Inc.*D
Winegard Co.
Zenith Sales Co.

Audio/video accessories

A/B SWITCHES

Ambico
American Design Components
Arrow Electronics
Atrix, Inc.*D
Vance Baldwin Inc.*D
B-B&W Electronics*D
Bursma Electronic Distrib.*D
Cititronix/Panson*D
Computer Component Source*D
Computer Svcs of America*D
Consolidated Electronics, Inc.*D
CSI/SPCCO
The Current Source*D
Dalbani Corporation*D 77
Dalco Electronics*D
East Coast Transistor*D
Eiger Electronics*D

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Electro Standards Lab, Inc.
Electronic Parts Supply*D
Electronics Warehouse Corp.*D
Electronix Corp.*D
Electronix Express*D
Excel Distributing*D
Fox International*D
GC Electronics*D
Herman Electronics*D 11
Hosfelt Electronics, Inc.*D
Innovative Solutions
Internat'l Components Corp.*D
Jameco Electronics Components*D
JDR Micro*D
Joseph Electronics*D
Kelvin Electronics*D
MAI/Prime Parts*D
M.A.T. Electronics*D 74
MCM Electronics*D 15
Multidyne
Omnitron Electronics*D
Parts Express*D 53
Pfanstiehl Corp.*D
RNJ Electronics Inc.*D 52
RS Electronics*D
Sony Service Co.
Support Systems International
Tritronics, Inc.*D
Union Electronics*D
Wholesale Electronics Inc.*D
Winegard Co.
Zenith Sales Co.

COUPLERS/SPLITTERS

Allied Electronics, Inc.*D
Arrow Electronics
AudioVisual Inc.*D
Vance Baldwin Inc.*D
B-B&W Electronics*D
Bursma Electronic Distrib.*D
Channel Master
Cititronix/Panson*D
Computer Component Source*D
Consolidated Electronics, Inc.*D
CSI/SPCCO
The Current Source*D
Dalbani Corporation*D 77
East Coast Transistor*D
Eiger Electronics*D
Electron Processing
Electronic Parts Supply*D
Electronics Warehouse Corp.*D
Electronix Corp.*D
Fox International*D
GC Electronics*D
Herman Electronics*D 11
Hosfelt Electronics, Inc.*D
Jameco Electronics Components*D
JDR Micro*D
Joseph Electronics*D
Kelvin Electronics*D
MAI/Prime Parts*D
M.A.T. Electronics*D 74
MCM Electronics*D 15
Microwave Filter Company, Inc.
Multiplex Technology, Inc.
Omnitron Electronics*D
Parts Express*D 53
Pfanstiehl Corp.*D
Premium Parts+ Electronics Co*D
RNJ Electronics Inc.*D 52
RS Electronics*D
Sony Service Co.
Support Systems International
Tandy National Parts*D
Tritronics, Inc.*D
Union Electronics*D
Wholesale Electronics Inc.*D
Winegard Co.
Zenith Sales Co.

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FILTERS

Allied Electronics, Inc.*D
American Design Components
Arrow Electronics
Vance Baldwin Inc.*D
B-B&W Electronics*D
Bursma Electronic Distrib.*D
The Current Source*D
Dalbani Corporation*D 77
East Coast Transistor*D
Eiger Electronics*D
Electron Processing
Electronic Specialists, Inc.
Electronics Warehouse Corp.*D
Electronix Corp.*D
Fox International*D
Herman Electronics*D 11
Joseph Electronics*D
MAI/Prime Parts*D
M.A.T. Electronics*D 74
MCM Electronics*D 15
Mouser Electronics*D
Multiplex Technology, Inc.
Parts Express*D 53
RNJ Electronics Inc.*D 52
Schurter, Inc.
Sony Service Co.
Tritronics, Inc.*D
Union Electronics*D
Wholesale Electronics Inc.*D

RF SWITCHERS

Arrow Electronics
Vance Baldwin Inc.*D
B-B&W Electronics*D
Bursma Electronic Distrib.*D
Channel Master
Cititronix/Panson*D
Computer Component Source*D
Compuvideo
Consolidated Electronics, Inc.*D
CSI/SPCCO
The Current Source*D
Dalbani Corporation*D 77
East Coast Transistor*D
Eiger Electronics*D
Electron Processing
Electronic Parts Supply*D
Electronics Warehouse Corp.*D
Electronix Corp.*D
Foley-Belsaw*D
Fox International*D
Herman Electronics*D 11
Joseph Electronics*D
Kelvin Electronics*D
MAI/Prime Parts*D
M.A.T. Electronics*D 74
MCM Electronics*D 15
Multiplex Technology, Inc.
Pfanstiehl Corp.*D
RNJ Electronics Inc.*D 52
Sony Service Co.
Tritronics, Inc.*D
Union Electronics*D
Wholesale Electronics Inc.*D

SIGNAL MIXERS

Arrow Electronics
AudioVisual Inc.*D
Vance Baldwin Inc.*D
B-B&W Electronics*D
Bursma Electronic Distrib.*D
Compuvideo
Consolidated Electronics, Inc.*D
The Current Source*D
Dalbani Corporation*D 77
East Coast Transistor*D
Eiger Electronics*D

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Electronics Warehouse Corp.*D
Fox International*D
Joseph Electronics*D
MCM Electronics*D 15
Multiplex Technology, Inc.
Pfanstiehl Corp.*D
RNJ Electronics Inc.*D 52
Sony Service Co.
Tritronics, Inc.*D
Union Electronics*D
Wholesale Electronics Inc.*D
Zenith Sales Co.

Tools

HEAT GUNS

Allied Electronics, Inc.*D
Arrow Electronics
Vance Baldwin Inc.*D
B-B&W Electronics*D
Bursma Electronic Distrib.*D
Cititronix/Panson*D
Computer Component Source*D
Computer Svcs of America*D
Consolidated Electronics, Inc.*D
Contact East*D
Cooper Tools
The Current Source*D
Dalbani Corporation*D 77
Digi-Key D*
East Coast Transistor*D
Eiger Electronics*D
Electro Insulation Corporation
Electro Tool, Inc.
Electronic Prod. Specialties*D
Electronics Warehouse Corp.*D
Electronix Express*D
The Eraser Company, Wybar Div.
Foley-Belsaw*D
Galco Industrial Electronics*D
Fox International*D
Harco Electronics*D
Herman Electronics*D 11
HMC - Hub Material Co.*D
Hosfelt Electronics, Inc.*D
Jameco Electronics Components*D
JDV Products Inc.
W.S. Jenks & Son*D
Jensen Tools, Inc.*D
Joseph Electronics*D
Kelvin Electronics*D
MAI/Prime Parts*D
Manhattan/CDT
Marshall Industries*D
M.A.T. Electronics*D 74
MCM Electronics*D 15
Mouser Electronics*D
Omnitron Electronics*D
Parts Express*D 53
Philips Consumer Electronics*M/D
Portasol, Inc.
Print Products International*D
RNJ Electronics Inc.*D 52
RS Electronics*D
Snap-On Incorporated
Sony Service Co.
Specialized Prods Company*D
Techni-Tool, Inc.*D
Time Motion Tools*D
Tritronics, Inc.*D
Ungar, A Rubbermaid Co.
Union Electronics*D
Wahl Clipper Corporation
Weidmuller Inc.
Wholesale Electronics Inc.*D

JIGS/FIXTURES/VISES

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B-B&W Electronics*D
Bursma Electronic Distrib.*D
Cititronix/Panson*D
Computer Component Source*D
Consolidated Electronics, Inc.*D
Contact East*D
Cooper Tools
The Current Source*D
Dalbani Corporation*D 77
Digi-Key D*
Electro Tool, Inc.
Electronic Prod. Specialties*D
Electronics Warehouse Corp.*D
Electronix Corp.*D
Electronix Express*D
Fox International*D
Harco Electronics*D
Herman Electronics*D 11
Hitachi Home Electronics
HMC - Hub Material Co.*D
Jameco Electronics Components*D
JDR Micro*D
JDV Products Inc.
W.S. Jenks & Son*D
Joseph Electronics*D
Kelvin Electronics*D
MCM Electronics*D 15
Mouser Electronics*D
Omnitron Electronics*D
PanaVise Products
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Philips Consumer Electronics*M/D
Premium Parts+ Electronics Co*D
RNJ Electronics Inc.*D 52
Snap-On Incorporated
Sony Service Co.
Techni-Tool, Inc.*D
Time Motion Tools*D
Tritronics, Inc.*D
Union Electronics*D
Wholesale Electronics Inc.*D

SOLDERING/DESOLDERING EQUIPMENT

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Alternative Technical Services
American Design Components
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A.P.E.
Arrow Electronics
Atrix, Inc.*D
Vance Baldwin Inc.*D
Bonkote America Inc.
B-B&W Electronics*D
Bursma Electronic Distrib.*D
C&S Sales*D
CAIG Laboratories, Inc.....77
Cititronix/Panson*D
Computer Component Source*D
Computer Svcs of America*D
Consolidated Electronics, Inc.*D
Contact East*D
Cooper Tools
CSTS Inc.
The Current Source*D
Dalbani Corporation*D 77
Dalco Electronics*D
Den-On Instruments, Inc.
Digi-Key D*
East Coast Transistor*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electro Tool, Inc.
Electronic Prod. Specialties*D
Electronic Parts Supply*D
Electronics Warehouse Corp.*D
Electronix Corp.*D
Electronix Express*D
Elenco Electronics, Inc.
Elvo Division of
ESP Inc.
Excel Distributing*D
Foley-Belsaw*D
Fox International*D
Galco Industrial Electronics*D
GC Electronics*D
The Granite Corp.
American Hakko Products
Harco Electronics*D
Heath Company
Herman Electronics*D 11
Hexacon Electric Co.
Hitachi Home Electronics
HMC - Hub Material Co.*D
Hosfelt Electronics, Inc.*D
Howard Electrnc Insts Inc.*D
Jameco Electronics Components*D
JDR Micro*D
JDV Products Inc.
W.S. Jenks & Son*D
Jim-Pak*D
Joseph Electronics*D
Kelvin Electronics*D
Leads Metal Products (ENDECO)
MAI/Prime Parts*D
Marshall Industries*D
M.A.T. Electronics*D 74
MCM Electronics*D 15
METCAL
Mouser Electronics*D
Multicore Solders
P.K. Neuses*D
M.M. Newman Corporation
Nu-Concept Systems
O.K. Industries, Inc.
Omega Engineering, Inc.
Omnitron Electronics*D
PACE, Inc.
Parts Express*D 53
PC Service Source*D
Philips Consumer Electronics*M/D
Philips ECG
Plato Products, Inc.
Portasol, Inc.
Premium Parts+ Electronics Co*D
Print Products International*D
RNJ Electronics Inc.*D 52
RS Electronics*D
Salen Enterprises*D
Snap-On Incorporated
SAT/ A SPIRIG CO.
Sony Service Co.
Specialized Prods Company*D
Start International*D
Tandy National Parts*D
Techni-Tool, Inc.*D
Time Motion Tools*D
Tritronics, Inc.*D
Tucker Electronics Co.
Ungar, A Rubbermaid Co.
Union Electronics*D
Virtual Industries
Wahl Clipper Corporation
Wholesale Electronics Inc.*D
Xytronic

TOOL CASES

Allied Electronics, Inc.*D
American Design Components
Amprobe Instrument
Andrews Electronics*D.....47
Arrow Electronics
Atrix, Inc.*D
Vance Baldwin Inc.*D
B-B&W Electronics*D
Bursma Electronic Distrib.*D
Chicago Case Company
Computer Component Source*D
Consolidated Electronics, Inc.*D
Contact East*D
Cooper Tools
The Current Source*D
Dalbani Corporation*D 77
Dalco Electronics*D
Diversified Case Co., Inc.
East Coast Transistor*D
E.I.L. Instruments, Inc.*D
Electro Tool, Inc.
Electronic Prod. Specialties*D
Electronics Warehouse Corp.*D
Electronix Corp.*D
Electronix Express*D
Elenco Electronics, Inc.
C.H. Ellis Company, Inc.
Fox International*D
Gemini Inc.
Harco Electronics*D
Herman Electronics*D 11
Highland Products, Inc.
HMC - Hub Material Co.*D
Hosfelt Electronics, Inc.*D
Hy Tec Dealer Service
Jameco Electronics Components*D
JDR Micro*D
JDV Products Inc.
W.S. Jenks & Son*D
Jensen Tools, Inc.*D
Jonard Industries Corp.
Joseph Electronics*D
Kelvin Electronics*D
Klein Tools, Inc.
MAI/Prime Parts*D
Marshall Industries*D
M.A.T. Electronics*D 74
MCM Electronics*D 15
Melmat Inc *D
P.K. Neuses*D
Omega Engineering, Inc.
Omnitron Electronics*D
Parts Express*D 53
PC Service Source*D
Philips Consumer Electronics*M/D
Philips ECG
Platt Luggage, Inc.
Premium Parts+ Electronics Co*D
Print Products International*D
R&K Supply Co.*D
RNJ Electronics Inc.*D 52
RS Electronics*D
Snap-On Incorporated
Sony Service Co.
Specialized Prods Company*D
Spencer Industries
Tandy National Parts*D
Techni-Tool, Inc.*D
Time Motion Tools*D
Tritronics, Inc.*D
Union Electronics*D
Wholesale Electronics Inc.*D
Zero Corp., East Div.

TOOL KITS

Allied Electronics, Inc.*D
American Design Components
Andrews Electronics*D.....47
Arrow Electronics
Atrix, Inc.*D
Vance Baldwin Inc.*D
Bursma Electronic Distrib.*D
C&S Sales*D
Clauss Electronics Div.
Computer Component Source*D
Computer Svcs of America*D
Consolidated Electronics, Inc.*D
Contact East*D
Cooper Tools
The Current Source*D
Dalbani Corporation*D 77
Dalco Electronics*D
East Coast Transistor*D

(Continued on page 47)

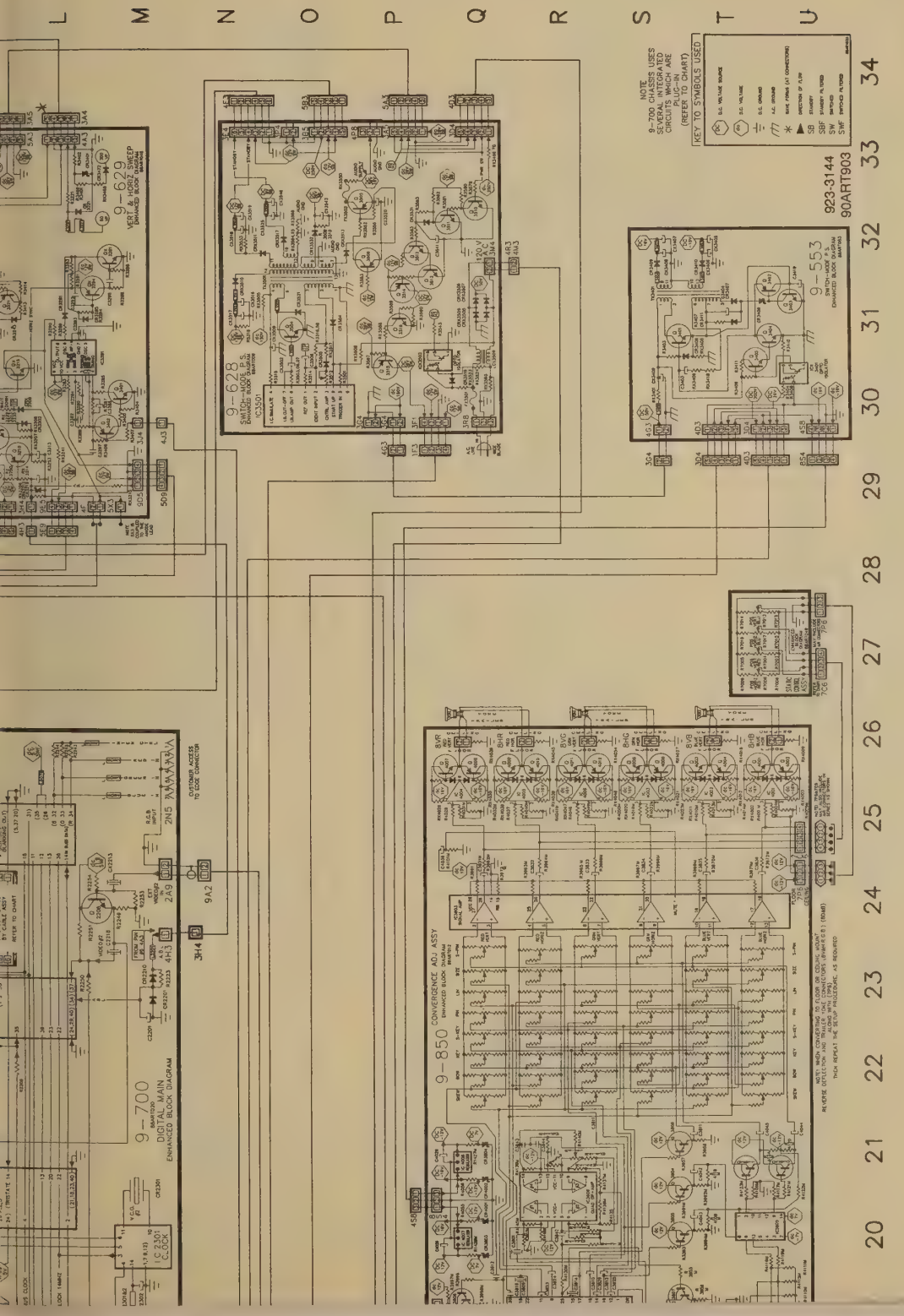
Main Schematic Diagram

This schematic is for the use of qualified technicians only. This instrument contains no user-serviceable parts.

The other portions of this schematic may be found on other Profax pages.

All integrated circuits and many other semiconductors are electrostatically sensitive and require special handling techniques.

PULL OUT TO OPEN


L M N O P Q R S T U
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34
9-629 VERT + E-W SWEEP ENHANCED BLOCK DIAGRAM
9-628 SWITCH-MODE P.S. ENHANCED BLOCK DIAGRAM CR350
9-553 ENHANCED BLOCK DIAGRAM
9-700 DIGITAL MAIN ENHANCED BLOCK DIAGRAM
9-850 CONVERGENCE ADJ ASSY ENHANCED BLOCK DIAGRAM
NOTE 9-700 CHASSIS USES SEVERAL INTEGRATED CIRCUITS WHICH ARE PLUG-IN (REFER TO CHART)
KEY TO SYMBOLS USED
923-3144
90ART903

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Electronics Warehouse Corp.*D
Fox International*D
Joseph Electronics*D
MCM Electronics*D 15
Multiplex Technology, Inc.
Pfanstiehl Corp.*D
RNJ Electronics Inc.*D 52
Sony Service Co.
Tritronics, Inc.*D
Union Electronics*D
Wholesale Electronics Inc.*D
Zenith Sales Co.

Tools

HEAT GUNS

Allied Electronics, Inc.*D
Arrow Electronics
Vance Baldwin Inc.*D
B-B&W Electronics*D
Bursma Electronic Distrib.*D
Cititronix/Panson*D
Computer Component Source*D
Computer Svcs of America*D
Consolidated Electronics, Inc.*D
Contact East*D
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East Coast Transistor*D
Eiger Electronics*D
Electro Insulation Corporation
Electro Tool, Inc.
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Electronics Warehouse Corp.*D
Electronix Express*D
The Eraser Company, Wybar Div.
Foley-Belsaw*D
Galco Industrial Electronics*D
Fox International*D
Harco Electronics*D
Herman Electronics*D 11
HMC - Hub Material Co.*D
Hosfelt Electronics, Inc.*D
Jameco Electronics Components*D
JDV Products Inc.
W.S. Jenks & Son*D
Jensen Tools, Inc.*D
Joseph Electronics*D
Kelvin Electronics*D
MAI/Prime Parts*D
Manhattan/CDT
Marshall Industries*D
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MCM Electronics*D 15
Mouser Electronics*D
Omnitron Electronics*D
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Print Products International*D
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Time Motion Tools*D
Tritronics, Inc.*D
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Union Electronics*D
Wahl Clipper Corporation
Weidmuller Inc.
Wholesale Electronics Inc.*D

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Electro Tool, Inc.
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Electronics Warehouse Corp.*D
Electronix Corp.*D
Electronix Express*D
Fox International*D
Harco Electronics*D
Herman Electronics*D 11
Hitachi Home Electronics
HMC - Hub Material Co.*D
Jameco Electronics Components*D
JDR Micro*D
JDV Products Inc.
W.S. Jenks & Son*D
Joseph Electronics*D
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MCM Electronics*D 15
Mouser Electronics*D
Omnitron Electronics*D
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Sony Service Co.
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Time Motion Tools*D
Tritronics, Inc.*D
Union Electronics*D
Wholesale Electronics Inc.*D

SOLDERING/DESOLDERING EQUIPMENT

Aervo-Pacific Co.
Allied Electronics, Inc.*D
Alternative Technical Services
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Andrews Electronics*D.....47
A.P.E.
Arrow Electronics
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Vance Baldwin Inc.*D
Bonkote America Inc.
B-B&W Electronics*D
Bursma Electronic Distrib.*D
C&S Sales*D
CAIG Laboratories, Inc.....77
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Computer Component Source*D
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Den-On Instruments, Inc.
Digi-Key D*
East Coast Transistor*D
Eiger Electronics*D
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Electro Tool, Inc.
Electronic Prod. Specialties*D
Electronic Parts Supply*D
Electronics Warehouse Corp.*D
Electronix Corp.*D
Electronix Express*D
Elenco Electronics, Inc.
Elvo Division of
ESP Inc.
Excel Distributing*D
Foley-Belsaw*D
Fox International*D
Galco Industrial Electronics*D
GC Electronics*D
The Granite Corp.
American Hakko Products
Harco Electronics*D
Heath Company
Herman Electronics*D 11
Hexacon Electric Co.
Hitachi Home Electronics
HMC - Hub Material Co.*D
Hosfelt Electronics, Inc.*D
Howard Electrnc Insts Inc.*D
Jameco Electronics Components*D
JDR Micro*D
JDV Products Inc.
W.S. Jenks & Son*D
Jim-Pak*D
Joseph Electronics*D
Kelvin Electronics*D
Leads Metal Products (ENDECO)
MAI/Prime Parts*D
Marshall Industries*D
M.A.T. Electronics*D 74
MCM Electronics*D 15
METCAL
Mouser Electronics*D
Multicore Solders
P.K. Neuses*D
M.M. Newman Corporation
Nu-Concept Systems
O.K. Industries, Inc.
Omega Engineering, Inc.
Omnitron Electronics*D
PACE, Inc.
Parts Express*D 53
PC Service Source*D
Philips Consumer Electronics*M/D
Philips ECG
Plato Products, Inc.
Portasol, Inc.
Premium Parts+ Electronics Co*D
Print Products International*D
RNJ Electronics Inc.*D 52
RS Electronics*D
Salen Enterprises*D
Snap-On Incorporated
SAT/ A SPIRIG CO.
Sony Service Co.
Specialized Prods Company*D
Start International*D
Tandy National Parts*D
Techni-Tool, Inc.*D
Time Motion Tools*D
Tritronics, Inc.*D
Tucker Electronics Co.
Ungar, A Rubbermaid Co.
Union Electronics*D
Virtual Industries
Wahl Clipper Corporation
Wholesale Electronics Inc.*D
Xytronic

TOOL CASES

Allied Electronics, Inc.*D
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Computer Component Source*D
Consolidated Electronics, Inc.*D
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Dalco Electronics*D
Diversified Case Co., Inc.
East Coast Transistor*D
E.I.L. Instruments, Inc.*D
Electro Tool, Inc.
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Electronics Warehouse Corp.*D
Electronix Corp.*D
Electronix Express*D
Elenco Electronics, Inc.
C.H. Ellis Company, Inc.
Fox International*D
Gemini Inc.
Harco Electronics*D
Herman Electronics*D 11
Highland Products, Inc.
HMC - Hub Material Co.*D
Hosfelt Electronics, Inc.*D
Hy Tec Dealer Service
Jameco Electronics Components*D
JDR Micro*D
JDV Products Inc.
W.S. Jenks & Son*D
Jensen Tools, Inc.*D
Jonard Industries Corp.
Joseph Electronics*D
Kelvin Electronics*D
Klein Tools, Inc.
MAI/Prime Parts*D
Marshall Industries*D
M.A.T. Electronics*D 74
MCM Electronics*D 15
Melmat Inc *D
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Omega Engineering, Inc.
Omnitron Electronics*D
Parts Express*D 53
PC Service Source*D
Philips Consumer Electronics*M/D
Philips ECG
Platt Luggage, Inc.
Premium Parts+ Electronics Co*D
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Sony Service Co.
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Tandy National Parts*D
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Time Motion Tools*D
Tritronics, Inc.*D
Union Electronics*D
Wholesale Electronics Inc.*D
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TOOL KITS

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Vance Baldwin Inc.*D
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Dalco Electronics*D
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Zenith
Digital Direct View
Model No. CM-142

March 1996

Main Schematic Diagram

Product safety should be considered when component replacement is made in any area of an electronics product. A star next to a component symbol number designates components in which safety is of special significance. It is recommended that only exact cataloged parts be used for replacement of these components.

Use of substitute replacement parts that do not have the same safety characteristics as recommended in factory service information may create shock, fire, excessive x-radiation or other hazards.

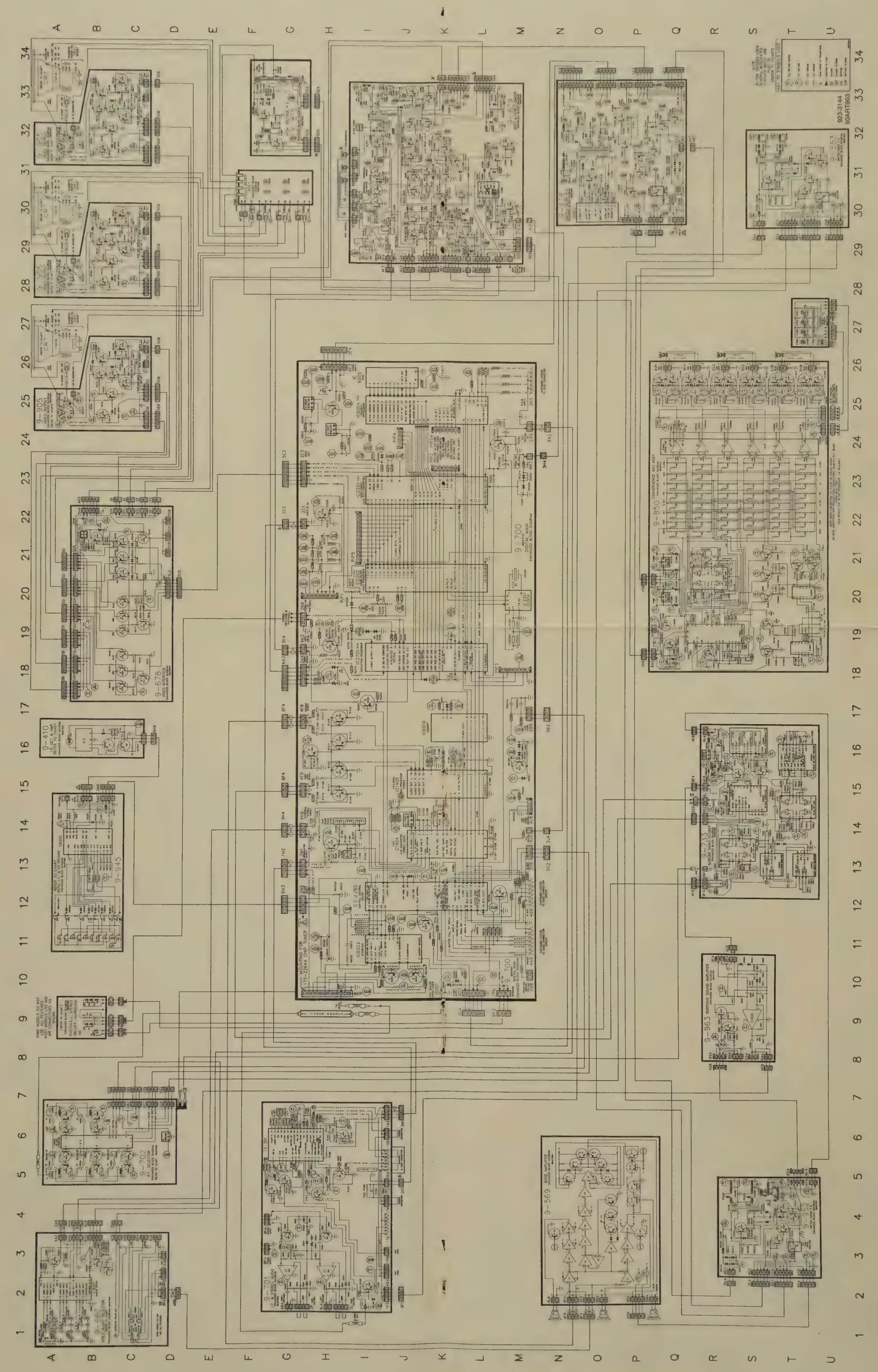
Main Schematic Diagram

This schematic is for the use of qualified technicians only. This instrument contains no user-serviceable parts.

The other portions of this schematic may be found on other Profax pages.

All integrated circuits and many other semiconductors are electrostatically sensitive and require special handling techniques.

PULL OUT TO OPEN



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Zenith
Digital Direct View
Model No. CM-142

PROFAX es&t Manufacturers' schematics

March 1996

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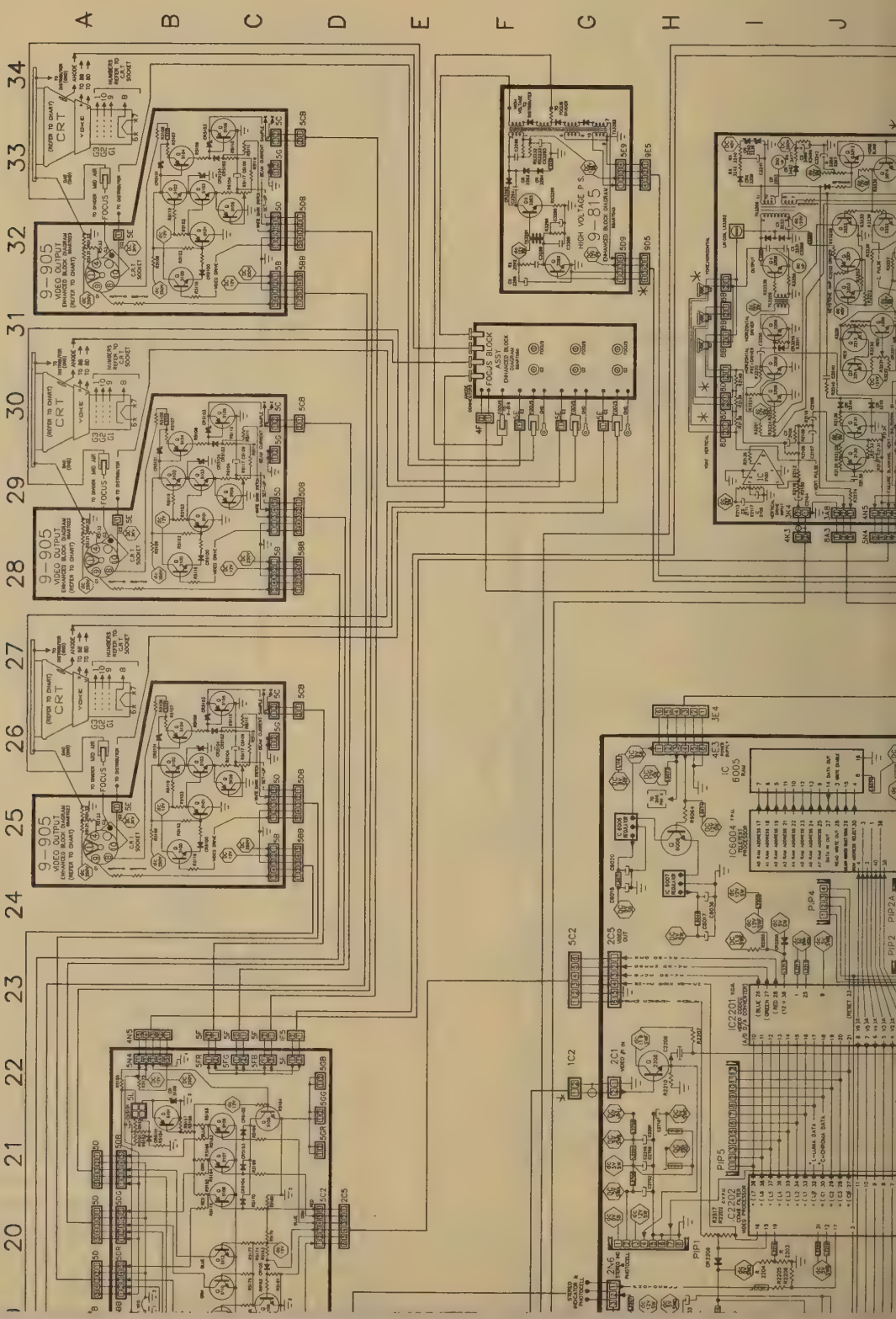

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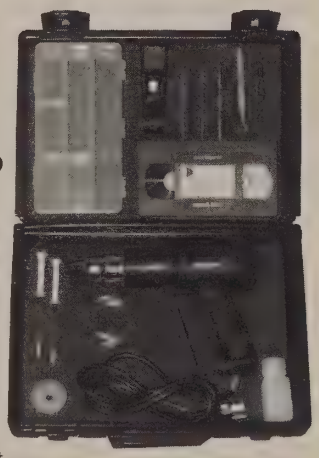

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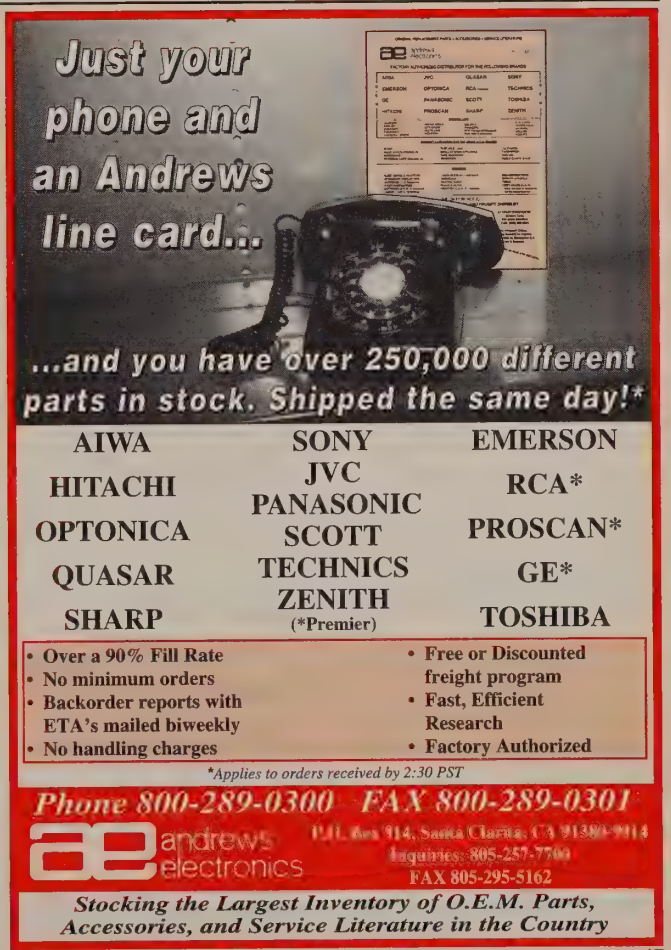

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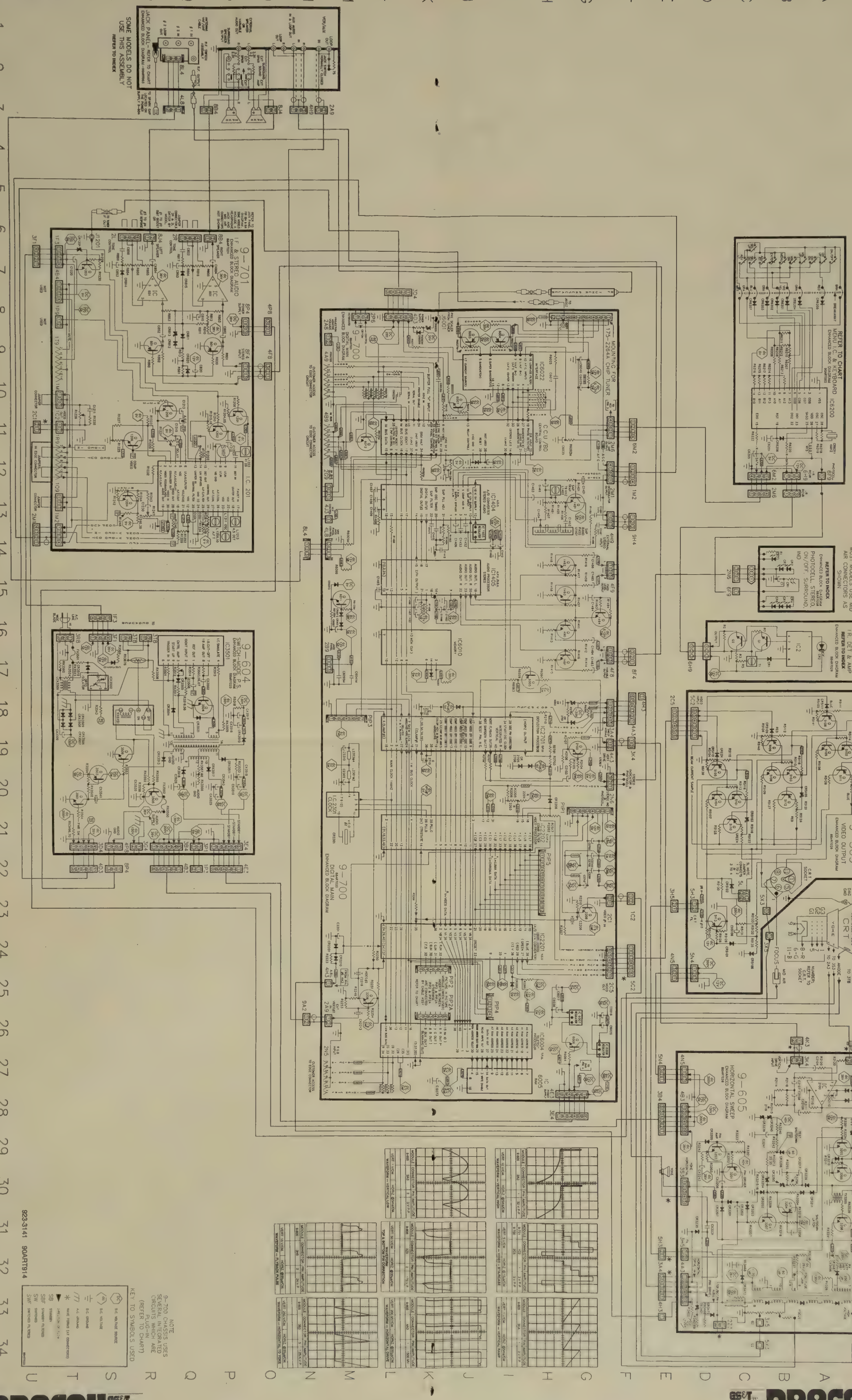
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9-700
DIGITAL MAIN ENHANCED BLOCK DIAGRAM
9-604
SWITCH-MODE P.S. ENHANCED BLOCK DIAGRAM
9-605
HORIZONTAL SWEEP ENHANCED BLOCK DIAGRAM
9-369
VIDEO OUTPUT ENHANCED BLOCK DIAGRAM
9-410
I.R. DET & AMP ENHANCED BLOCK DIAGRAM
REFER TO CHART
MENU I.C. & KEYBOARD ENHANCED BLOCK DIAGRAM
REFER TO INDEX
PHOTOCELL, STEREO, ON/OFF, SURROUND, IND ENHANCED BLOCK DIAGRAM
SOME MODELS DO NOT USE THIS ASSEMBLY
REFER TO INDEX
SOME MODELS DO NOT USE ALL FEATURES. MOST MODELS USE MID AIR CONNECTORS AS SHOWN
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9-700 CHASSIS USES SEVERAL DAUGHTER CIRCUITS WHICH ARE PLUG-IN
(REFER TO CHART)
KEY TO SYMBOLS USED
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PROFAX Manufacturers' schematics
March 1996
Zenith
Rear Projector
Color TV
Model No. PV-142

Main Schematic Diagram

Product safety should be considered when component replacement is made in any area of an electronics product. A star next to a component symbol number designates components in which safety is of special significance. It is recommended that only exact cataloged parts be used for replacement of these components.

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Consolidated Electronics, Inc.*D
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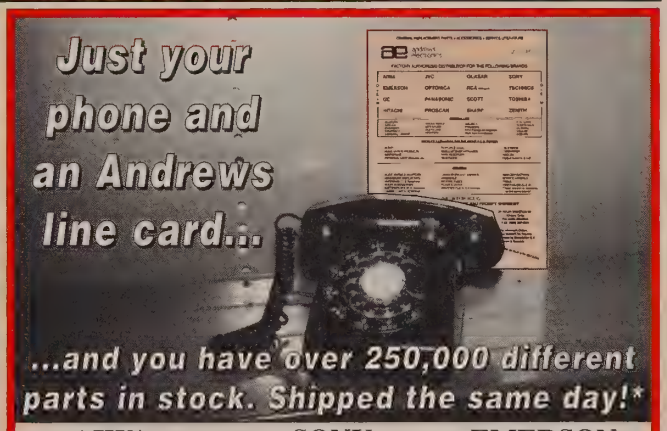

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A line listing that is in color indicates that the company has an ad in this issue. The number following the listing is the number of the page on which the ad is located. BC means Back Cover. IBC means Inside Back Cover, the IFC means Inside Front Cover.

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Technics
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AudioVisual Inc.*D
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Cooper Associates*D
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Diversified Parts*D
East Coast Transistor*D
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Electronic Parts Supply*D
Electronics Warehouse Corp.*D
Electronix Corp.*D
Electronix Express*D
Excel Distributing*D
Foley-Belsaw*D
Fox International*D
Galco Industrial Electronics*D
GC Electronics*D
Global Micro-Parts Depot*D
Herman Electronics*D 11
Hitachi Home Electronics
Hosfelt Electronics, Inc.*D
Internat'l Components Corp.*D
Jameco Electronics Components*D
Joseph Electronics*D
Kelvin Electronics*D
L.J. Enterprises*D
MAI/Prime Parts*D
M.A.T. Electronics*D 74
MCM Electronics*D 15
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Parts Express*D 53
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Philips Consumer Electronics*M/D
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Quasar
RNJ Electronics Inc.*D 52
RS Electronics*D
Russell Industries*D
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Amcom Corporaton*D
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Bursma Electronic Distrib.*D
Cititronix/Panson*D
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Computer Component Source*D
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Electronics Warehouse Corp.*D
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Hosfelt Electronics, Inc.*D
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MCD Electronics *D
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Russell Industries*D
Schurter, Inc.
SMH Electronics Co., Inc.
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Tandy National Parts*D
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Tritronics, Inc.*D
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East Coast Transistor*D
Eiger Electronics*D
Electronic Parts Supply*D
Electronics Warehouse Corp.*D
Electronix Corp.*D
Electronix Express*D
Excel Distributing*D
E-Z Hook
Fox International*D
Herman Electronics*D 11
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Hosfelt Electronics, Inc.*D
Jameco Electronics Components*D
Joseph Electronics*D
Kelvin Electronics*D
Keystone Electronics Corp.
Klein Tools, Inc.
MAI/Prime Parts*D
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MCM Electronics*D 15
Mouser Electronics*D
Philips Consumer Electronics*M/D
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Computer Component Source*D
Computer Svcs of America*D
Cooper Associates*D
The Current Source*D
Digi-Key D*
Diversified Parts*D
Eiger Electronics*D
Electronix Corp.*D
Electronix Express*D
Excel Distributing*D
Fox International*D
Hitachi Home Electronics
Hosfelt Electronics, Inc.*D
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Joseph Electronics*D
MAI/Prime Parts*D
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SHOGYO International Corp.
Sony Service Co.
Tandy National Parts*D
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Tritronics, Inc.*D
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Andrews Electronics*D.....47
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B-B&W Electronics*D
Bursma Electronic Distrib.*D
Cititronix/Panson*D
Classic Cmpnts Supply, Inc.*D
Computer Component Source*D
Consolidated Electronics, Inc.*D
Contact East*D
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East Coast Transistor*D
Eiger Electronics*D
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Electronix Corp.*D
Electronix Express*D
Excel Distributing*D
Foley-Belsaw*D
Galco Industrial Electronics*D
GC Electronics*D
Fox International*D
Herman Electronics*D 11
Hitachi Home Electronics
Industrial Devices, Inc.
Jameco Electronics Components*D
JDR Micro*D
Joseph Electronics*D
Kelvin Electronics*D
MAI/Prime Parts*D
M.A.T. Electronics*D 74
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Pfanstiehl Corp.*D
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RS Electronics*D
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SHOGYO International Corp.
Sony Service Co.
Sprague Magnetics, Inc.*D
Tandy National Parts*D
A.G. Tannenbaum*D
Technics
Tritronics, Inc.*D
Union Electronics*D
Wholesale Electronics Inc.*D

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Truminco of California Inc.*D
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Eiger Electronics*D
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Excel Distributing*D
Fox International*D
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Jameco Electronics Components*D
Joseph Electronics*D
MCM Electronics*D15
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SMH Electronics Co., Inc.
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Union Electronics*D
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Amcom Corporaton*D
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Vance Baldwin Inc.*D
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Bursma Electronic Distrib.*D
Cititronix/Panson*D
Computer Component Source*D
Computer Svcs of America*D
The Current Source*D
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Diversified Parts*D
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Excel Distributing*D
Fox International*D
Galco Industrial Electronics*D
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Hosfelt Electronics, Inc.*D
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Joseph Electronics*D
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Premium Parts+ Electronics Co*D
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SMH Electronics Co., Inc.
Sony Service Co.
Sprague Magnetics, Inc.*D
Superior Electric
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Cititronix/Panson*D
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Consolidated Electronics, Inc.*D
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Fox International*D
Hitachi Home Electronics
Joseph Electronics*D
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Pfanstiehl Corp.*D
Philips Consumer Electronics*M/D
Philips ECG
Richardson Electronics, Ltd.*D
RNJ Electronics Inc.*D 52
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Sony Service Co.
A.G. Tannenbaum*D
Tritronics, Inc.*D
Union Electronics*D
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B-B&W Electronics*D
Bursma Electronic Distrib.*D
Cititronix/Panson*D
Computer Component Source*D
Computer Svcs of America*D
Compuvideo
The Current Source*D
Curtis Mathes Parts & Service
Diversified Parts*D
Eiger Electronics*D
Electronic Parts Supply*D
Excel Distributing*D
Fox International*D
Herman Electronics*D 11
Hitachi Home Electronics
Joseph Electronics*D
MCM Electronics*D 15
Module Exchange
Panasonic Industrial Co.
Philips Consumer Electronics*M/D
Philips ECG
Quasar
Richardson Electronics, Ltd.*D
RS Electronics*D
Sony Service Co.
Technics
Tritronics, Inc.*D
Union Electronics*D
Video Display Corporation
Warrantech Corp.
Wholesale Electronics Inc.*D
Zenith Sales Co.

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Arrow Electronics
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Vance Baldwin Inc.*D
B-B&W Electronics*D
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Classic Cmpnts Supply, Inc.*D
Computer Component Source*D
Consolidated Electronics, Inc.*D
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Galco Industrial Electronics*D
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RNJ Electronics Inc.*D 52
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SHOGYO International Corp.
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Tandy National Parts*D
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Tritronics, Inc.*D
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Allied Electronics, Inc.*D
American Design Components
Andrews Electronics*D.....47
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Arrow Electronics
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B-B&W Electronics*D
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Computer Component Source*D
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Fox International*D
Galco Industrial Electronics*D
Global Micro-Parts Depot*D
Hitachi Home Electronics
Jameco Electronics Components*D
JDR Micro*D
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Vance Baldwin Inc.*D
B-B&W Electronics*D
Bursma Electronic Distrib.*D
Cititronix/Panson*D
Classic Cmpnts Supply, Inc.*D
Computer Component Source*D
Computer Svcs of America*D
Connector Corporation
Consolidated Electronics, Inc.*D
Cooper Associates*D
The Current Source*D
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East Coast Transistor*D
Eiger Electronics*D
E.I.L. Instruments, Inc.*D
Electronics Warehouse Corp.*D
Electronix Corp.*D
Electronix Express*D
Excel Distributing*D
Fox International*D
Galco Industrial Electronics*D
Global Micro-Parts Depot*D
Hitachi Home Electronics
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Jameco Electronics Components*D
JDR Micro*D
Joseph Electronics*D
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JDR Micro*D
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Excel Distributing*D
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Fox International*D
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IC Master
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Snap-On Incorporated
Sony Service Co.
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Tandy National Parts*D
A.G. Tannenbaum*D
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Diversified Parts*D
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Eiger Electronics*D
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Electronic Parts Supply*D
Electronics Warehouse Corp.*D
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Electronix Express*D
Excel Distributing*D
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Galco Industrial Electronics*D
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Antique Automobile Radio*D
Antique Electronic Supply*D
Arrow Electronics
AudioVisual Inc.*D
Vance Baldwin Inc.*D
B-B&W Electronics*D
Bursma Electronic Distrib.*D

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Fox International*D
Galco Industrial Electronics*D
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Herman Electronics*D 11
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Hosfelt Electronics, Inc.*D
Jameco Electronics Components*D
JDR Micro*D
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Diversified Parts*D
Eiger Electronics*D
Electronics Warehouse Corp.*D
Fox International*D
Hitachi Home Electronics
Internat'l Components Corp.*D
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Compuvideo
Consolidated Electronics, Inc.*D
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East Coast Transistor*D
Eiger Electronics*D
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Electronics Warehouse Corp.*D
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E.M.T. Parts, Inc.*D
Excel Distributing*D
Foley-Belsaw*D
Fox International*D
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Cititronix/Panson*D
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Excel Distributing*D
Fox International*D
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Hitachi Home Electronics
Joseph Electronics*D
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Panasonic Industrial Co.
Philips Consumer Electronics*M/D
Philips ECG
Quasar
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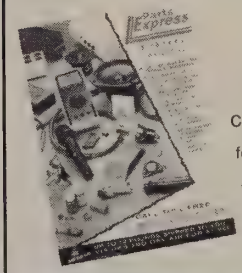

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Association/educational sources directory

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B-B&W Electronics*D
Bursma Electronic Distrib.*D
Butterworth Heinemann
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Computer Component Source*D
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Electronix Corp.*D
Electronic Technicians Assn.
Fluke Corporation ..... BC
Foley-Belsaw*D
Fotec Inc
Global Micro-Parts Depot*D
Fox International*D
Hameg Instruments, Inc.
Heath Company
Hosfelt Electronics, Inc.*D
IC Master
Industrial Training, Inc.
ISCET 78
Jameco Electronics Components*D
JDR Micro*D
W.S. Jenks & Son*D
Jim-Pak*D
M-USA Business Systems, Inc.
MAI/Prime Parts*D
M.A.T. Electronics*D 74
MCM Electronics*D 15
Mouser Electronics*D
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Nat'l Assoc. of Svc Dealers
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Tab Books
A.G. Tannenbaum*D
Tektronix, Inc.
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TV Man Tech Tips Inc. 74
Ucando VCR Educational Prod Co
Underwriters Laboratories, Inc
Union Electronics*D
United Techbook Company
Vintage TV and Radio Supply*D
WEKA Publishing, Inc.
ZMEX

EDUCATIONAL/TRAINING SEMINARS/VIDEOS

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CEDIA
Circuit Repair Corp.
Computer Component Source*D
Computer Maintenance Training
Curtis Mathes Parts & Service
Dranetz Technologies, Inc.
Eagan Technical Services, Inc. 47
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EIA/CEMA Product Services
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Fotec Inc
American Hakko Products
Industrial Training, Inc.
ISCET 78
W.S. Jenks & Son*D
JIT Resources, Inc.
Key Tek Instrument Corp.
Learning Group International
M-USA Business Systems, Inc.
MAI/Prime Parts*D
METCAL
Micro 2000, Inc.
National Advancement Corp.
Nat'l Assoc. of Svc Dealers
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PACE, Inc.
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Tech Assist, Inc.
Tektronix, Inc.
Trompeter Electronics
United Servicers Association
Warrantech Corp.

MANAGEMENT SOFTWARE SYSTEMS

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The Computer Industry Almanac
Data-Basics Inc.
Dranetz Technologies, Inc.
Electronics Warehouse Corp.*D
Industrial Training, Inc.
ISCET 78
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Philips Consumer Electronics*M/D
RAM Software Enterprises
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TV Man Tech Tips Inc. 74
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SCHOOLS: CORRESPONDENCE/ RESIDENT

Cleveland Inst. of Electronics
Computer Maintenance Training
Cook's Inst. of Elec. Engrg.
Foley-Belsaw*D
NRI School of Electronics
Philips Consumer Electronics*M/D
Philips Technical Training
Philips ECG
Sencore Electronics ..... IBC
World College

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Compuvideo
Consolidated Electronics, Inc.*D
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Curtis Mathes Parts & Service
Diversified Parts*D
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Hitachi Home Electronics
MAI/Prime Parts*D
M.A.T. Electronics*D 74
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Quasar
Howard W. Sams & Company 73
Sony Service Co.
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Tritronics, Inc.*D
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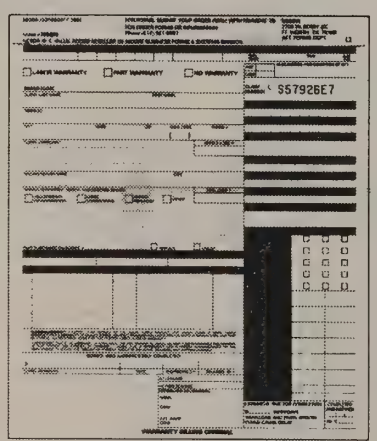

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JDR Micro*D
MCM Electronics*D.....15
Micro 2000, Inc.
Microcode Engineering
M-Test Equipment
Omega Engineering, Inc.
Ontrack Computer Systems
PC Service Source*D
Philips Consumer Electronics*M/D
SMH Electronics Co., Inc.
Sonera Technologies
Sony Service Co.
Tech Assist, Inc.
Touchstone Software Corp.
Vu-Data
Warrantech Corp.

CONSULTANTS

The Computer Industry Almanac
Controlled Power Co.
Coordinated Service, Inc.
Custom Data Associates
Fotronic Corporation*D
Galco Industrial Electronics*D
Good-Lyddon Data Systems
Innovative Solutions
JDR Micro*D
JIT Resources, Inc.
M-USA Business Systems, Inc.
Marshall Industries*D
MaxServe
Micro 2000, Inc.
Ontrack Computer Systems
Ontrack Data Recovery, Inc.
Philips Consumer Electronics*M/D
RAM Software Enterprises
Research Specialists Inc.
SOS Computer Solutions*D
Sprague Magnetics, Inc.*D
Ten-Lab

DISC DRIVE/HEAD REFURBISHMENT

Computer Svcs of America*D
Coordinated Service, Inc.
Fessenden Technologies
Gibson Research Corp.
Jameco Electronics Components*D
Micro 2000, Inc.
Reset, Inc.
Sprague Magnetics, Inc.*D
Warrantech Corp.

ONLINE SERVICES

Consolidated Electronics, Inc.*D
EURAS USA, Inc.
JDR Micro*D
MaxServe
Module Exchange
Philips ECG
Tech. Info. Procurement Serv. 75
Vicom

PC BOARD REPAIR/REWORK

Amcom Corporaton*D
A.P.E.
Circuit Repair Corp.
Coordinated Service, Inc.
Datatech Depot, Inc.
Eagan Technical Services, Inc. 47
Fessenden Technologies
Foresight Resources
Hosfelt Electronics, Inc.*D
Hy Tec Dealer Service
JDR Micro*D
W.S. Jenks & Son*D
KDM Associates
LaGuardia Enterprises
Module Exchange
Monitech
PTS Corporation
The Rex Company
Service Electronics Inc.
SMH Electronics Co., Inc.
SOS Computer Solutions*D
Sprague Magnetics, Inc.*D
ZMEX

RENTAL/LEASING EQUIPMENT

Accutest Instruments, Inc.*D
Amcom Corporaton*D
AT&T Capital Corporation*D
Custom Data Associates
Electronix Corp.*D
Fotronic Corporation*D
GlobeTech International, Inc.
SOS Computer Solutions*D
Tucker Electronics Co.

SERVICE BULLETIN SOFTWARE

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Philips Consumer Electronics*M/D
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SyncPulse Software
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Tech. Info. Procurement Serv. 75
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Plaza Distributing*D
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Sage Data Systems
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Service Management Software
Service Systems International
ServiceWare Corporation
Servicing Systems
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DW Smith & Associates
Sun Equipment Corporation
SyncPulse Software
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Warrantech Corp.

TEST EQUIPMENT REPAIR/CALIBRATION

Accutest Instruments, Inc.*D
Advanced Electronic Applicatio
Aristo Computers, Inc.
AT&T Capital Corporation*D
Brunelle Instruments, Inc.
Computer Svcs of America*D
Compuvideo
E.I.L. Instruments, Inc.*D
Electromatic Controls/
Electro-Metrics, Incorporated
Electronics Warehouse Corp.*D
Extech Instruments Corp.*D 73
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Fotec Inc
Fotronic Corporation*D
Galco Industrial Electronics*D
Hameg Instruments, Inc.
Hexacon Electric Co.
W.S. Jenks & Son*D
Sencore Electronics.....IBC
Tech Assist, Inc.
TEKSERV
Tucker Electronics Co.
Wavetek Corporation 3

TUNER/MODULE REPAIR

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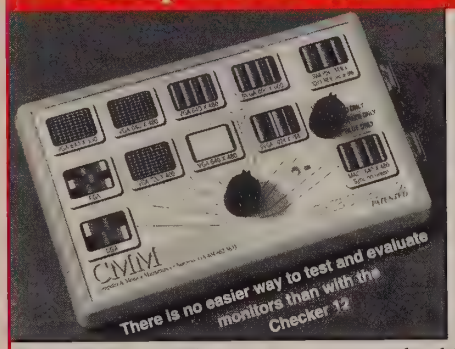
Bursma Electronic Distrib.*D
Eiger Electronics*D
Electronic Parts Supply*D
Electronic Software Developers.....78
Electronics Warehouse Corp.*D
Module Exchange
PTS Corporation
3E Corp.
Union Electronics*D
Wholesale Electronics Inc.*D

Computer Monitor Tester



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800-524-0747
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American Reliance
11801 Goldring Road
Arcadia, CA 91006
818-303-6688
800-654-9838
Fax: 818-358-3838

Ames Supply Co.*D
2537 Curtiss St
Downers Grove, IL 60515
800-323-3856

America West Communications And Electronics, Inc
1900 Elk Street
Rock Springs, WY 82901
307-382-5663
800-542-9378
Fax: 307-382-7323

Amherst Media, Inc.
155 Rano Street, Suite 300
Buffalo, NY 14207
716-874-4450
800-622-3278
Fax: 800-622-3298

AMP
PO Box 3608
Harrisburg, PA 17105-3608
717-564-0100
800-522-6752
Fax: 717-986-7575

Amphenol Corporation
Comm. and Network Prods. Div.
One Kennedy Avenue
Danbury, CT 06810
203-743-9272
800-825-5577
Fax: 203-796-2091

Amprobe Instrument
630 Merrick Rd.
PO Box 329
Lynbrook, NY 11563
516-593-5600
800-477-8658
Fax: 516-593-5682

Analog Technology Center Inc
62 Route 101A
Amherst, NH 03031
603-673-0404

Analogic Corp.
8 Centennial Drive
Peabody, MA 01960
508-977-3000
Fax: 508-977-6814

AnaTek Corporation
PO Box 1200
100 Merrimack Rd
Amherst, NH 03031
603-673-4342
800-999-0304
Fax: 603-673-5374

Andrews Electronics*D
PO Box 914
Santa Clarita, CA 91380-9014
805-257-7700 231
800-289-0300
Fax: 800-289-0301

Anritsu Meter Co. of America
P.O. Box 193
Franklin Lakes, NJ 07417
201-848-0033
800-457-2999
Fax: 201-848-1845

Antique Automobile Radio*D
700 Tampa Rd
Palm Harbor, FL 34683
813-785-8733
800-933-4926
Fax: 813-789-0283

Antique Electronic Supply*D
6221 South Maple Ave.
Tempe, AZ 85283
602-820-5411
Fax: 602-706-6789

Antique Radio Classified*D
P.O. Box 802-C12
Carlisle, MA 01741
508-371-0512
Fax: 508-371-7129

A.P.E.
142 Peconic Ave.
Medford, NY 11763-3201
516-654-1197
Fax: 516-289-4735

Apollo Wholesale
1944 W. Shady Grove
Irving, TX 75060

ARDIS
300 Knightsbridge Parkway
Lincolnshire, IL 60069
708-913-4229

Aristo Computers, Inc.
6700 S.W. 105th Avenue
Suite 307
Beaverton, OR 97008-5484
503-626-6333

Armand Mfg. Inc.
5020 Rivergrade Road
Baldwin Park, CA 91706
818-960-4081
800-343-7982
Fax: 818-338-5393

Company mailing addresses

Arrow Electronics
25 Hub Drive
Melville, NY 11747-3503
516-391-1300
Fax: 516-391-1640

ASTEA International, Inc.
100 Highpoint Drive
Chalfont, PA 18914
215-822-8888

Astea International
55 Middlesex Turnpike
Bedford, MA 01730
617-275-5440
Fax: 617-275-1910

ASTI Magnetics Corp.
84 S. Front
Bergenfield, NJ 07621
201-501-8900
800-221-1828
Fax: 201-385-1702

Atrix, Inc.*D
14301 Ewing Avenue South
Burnsville, MN 55337
612-894-6154
800-222-6154
Fax: 612-894-6256

AT&T Capital Corporation*D
Instrument Services
P.O. Box 619-260
D/FW Airport, TX 75261-9260
214-456-4000
800-874-7123
Fax: 214-456-4002

Audio Parts Co.*D
1070 South Orange Drive
Los Angeles, CA 90019
213-933-2141

AudioVisual Inc.*D
dba AVI Systems
6253 Bury Drive
Eden Prairie, MN 55346
612-949-3700
Fax: 612-949-6000

Automated Systems, Inc.
4827 Pioneer Blvd Suite 100
Lincoln, NE 68506
402-489-2717
800-279-7312
Fax: 402-489-2370

AVA Instrumentation, Inc.
9672 Manzanita Ave
Ben Lomond, CA 95005
408-336-2281
Fax: 408-336-5049

Aven Tools, Inc.
4676 Freedom Drive
Ann Arbor, MI 48108
313-973-0099

Avex Probes, Inc. (API)
1683 Winchester Road
PO Box 1026
Bensalem, PA 19020
215-638-3300
800-877-7623
Fax: 215-638-9108

AVO International
510 Township Line Road
Blue Bell, PA 19422-2795
215-646-9200
800-723-AVO1
Fax: 215-643-2670

B

B&B Electronics Manufacturing
707 Dayton Road
PO Box 1040
Ottawa, IL 61350
815-434-0846
Fax: 815-434-7094

Vance Baldwin Inc.*D
2701 SW 15th Street
Pompano Beach, FL 33069
954-969-1811
800-432-8542
Fax: 954-969-0226

Banner Technical Books, Inc.
1203 Grant Ave.
Rockford, IL 61103
815-962-4725

BAPCO Bowden's Automated Prods
1000 Industrial Rd
PO Box 536
Viborg, SD 57070
605-326-5169
800-419-4000
Fax: 605-326-5138

B-B&W Electronics*D
2137 S. Euclid Ave.
Berwin, IL 60402
708-749-1710
800-722-9684
Fax: 708-749-0325

Battery Specialties
3530 Cadillac Ave.
Costa Mesa, CA 92626-1408

Behlman Electronics
2021 Sperry Ave. Suite 18
Ventura, CA 93003
805-642-0660
800-456-2006
Fax: 805-642-0790

Belden Wire & Cable Company
PO Box 1980
Richmond, IN 47375
317-983-5200
800-235-3361
Fax: 317-983-5294

Bel Merit Corporation
26242 Dimension Dr. Suite 110
Lake Forest, CA 92630-7802
714-586-3700
Fax: 714-586-3399

Benedict Computer
220 Felton Drive
Menlo Park, CA 94025
415-323-0148
800-346-5186
Fax: 415-323-0156

Bergwall Productions, Inc.
540 Baltimore Pike
Chaddsford, PA 19317
215-388-0400
800-645-3565
Fax: 215-388-0405

Best Electronics*D
2021 The Alameda, Suite 290
San Jose, CA 95126
408-243-6950

Best Power
A Unit of General Signal
PO Box 280
Necedah, WI 54646
608-565-7200
800-356-5794
Fax: 608-565-2221

BGI Company, Inc. "AutoTech"
50509 Hollyhock Road
South Bend, IN 46637
219-277-8762
Fax: 219-277-8762

Bird Electronics Corp.
30303 Aurora Blvd.
Cleveland (Solon), OH 44139
216-248-1200
Fax: 216-248-5426

Bitwise Designs Inc.
50 Rotterdam Industrial Park
Schenectady, NY 12306
800-288-8728

B&K Precision
6470 West Cortland St.
Chicago, IL 60635
312-889-1448
Fax: 312-794-9740
800 462-9832

Blue Fin Technologies Inc.*D
55 Green Street
Portsmouth, NH 03801-3735
603-433-2223
Fax: 603-433-6437

BMI-Basic Measuring Instrument
3250 Jay Street
Santa Clara, CA 95054-3309
408-970-3700
800-876-5355
Fax: 408-970-3720

Bondhus Corporation
1400 East Broadway
P.O. Box 660
Monticello, MN 55362
612-295-2162
800-328-8310
Fax: 612-295-4440

Bonkote America, Inc.
Bridge St., PO Box 278
Three Rivers, MA 01080
413-289-1343
Fax: 413-289-1754

Brian Instruments, Inc.
626 S. State College Blvd.
Fullerton, CA 92631
714-992-5540
Fax: 714-992-5553

Brilliant King, Inc.
37 W. 39th St
Room 401
New York, NY 10018
212-730-6797
Fax: 212-730-6797

Brunelle Instruments, Inc.
PO Box 1223
Newport, VT 05855
819-563-9096
Fax: 819-569-1408

Burks, P.I.*D
842 S. Seventh Ave.
Louisville, KY 40203
502-589-3960
800-274-2875
Fax: 800-723-8383

Bursma Electronic Distrib.*D
1030 Scribner N.W.
Grand Rapids, MI 49504
616-459-4325
800-777-2604
Fax: 616-459-1294

Butterworth Heinemann
313 Washington St
Newton, MA 02158-1626
800-366-2665

C

C&S Sales*D
150 W. Carpenter Ave
Wheeling, IL 60090
800-292-7711
Fax: 708-541-9904

C. Hoelzle Associates, Inc.
17321 Eastman Street
Irvine, CA 92714-5523
714-251-9000
Fax: 714-251-9291

Cahill Electronics
160 Main Street
PO Box 568
Kingston, NH 03848
603-642-4292
Fax: 603-642-7941

CAIG Laboratories, Inc.
16744 West Bernardo Drive
San Diego, CA 92127-1904
619-451-1799
Fax: 619-451-2799
800-CAIG-123

Cambridge University Press
North American Branch
40 W. 20th St.
New York, NY 10011-4211
212-924-3900
Fax: 212-691-3239

Casio Technical Info Center
570 Mount Pleasant Avenue
Dover, NJ 07801
201-361-5400
800-458-0212

CEDIA
9202 N Meridian #200
Indianapolis, IN 46260
317-571-5602
800-669-5329
Fax: 317-571-5603

Central Point Software
15220 NW Greenbrier Parkway
Suite 200
Beaverton, OR 97006
800-445-4064

Cerplex Group, Inc
3332 E. LaPalma Ave.
Anaheim, CA 92705
714-566-3900
Fax: 714-259-1944

Channel Master
Div. of Avnet, Inc.
P.O. Box 1416
Smithfield, NC 27577
919-934-9711
Fax: 919-989-2200

Chapman Corporation
125 Presumpscot Street
PO Box 10700
Portland, ME 04104-6100
207-773-4726
Fax: 207-775-1369

Charleswater
Div. of Desco Industries, Inc.
90 Hudson Rd.
Canton, MA 02021-1407
617-964-8370
Fax: 617-964-0172

Chemtronics
8125 Cobb Center Drive
Kennesaw, GA 30144
404-424-4888
800-645-5244
Fax: 404-424-4267

Chicago Case Company
4446 Ashland Ave.
Chicago, IL 60609
312-927-1600
Fax: 800-333-8172

Chip Quik
3 Second St
Framingham, MA 01701
508-879-7727
800-836-2447

Circuit Repair Corp.
108 Turnpike
Rowley, MA 01969
508-948-7973
Fax: 508-948-2365

Circuit Specialists
Box 3047
Scottsdale, AZ 85257

Cititronix/Panson*D
1641 Dielman Road
St. Louis, MO 63132
314-427-3420
800-846-CITI
Fax: 800-397-8587

Clary Corp.
1960 S. Walker Ave.
Monrovia, CA 91016
818-359-4486
800-44-CLARY
Fax: 818-305-0254

Classic Cmpnts Supply, Inc.*D
3336 Commercial Ave.
Northbrook, IL 60062-1975
708-272-9650
Fax: 708-272-9264

Clauss Electronics Div.
223 N. Prospect
Fremont, OH 43420
419-332-7344
800-225-2877
Fax: 419-332-8077

Cleveland Inst. of Electronics
1776 East 17th St.
Cleveland, OH 44114
216-781-9400
800-CIE-OHIO
Fax: 216-781-0331

Clipper Products
P.O. Box 458200
Cincinnati, OH 45245
513-528-7011
800-543-0324
Fax: 513-528-7676

CN Software
A Division of CNS Inc.
100 Ford Road
Denville, NJ 07834
201-625-4056
Fax: 201-625-9489

Colorado Spectrum, Inc.
748 Whalers Way, Suite E-201
Fort Collins, CO 80525
303-225-6929

The Component Exchange
5-7 Ray Avenue
Burlington, MA 01803
800-786-9590
Fax: 617-391-9150

Computer Component Source*D
135 Eileen Way
Syosset, NY 11791
516-496-8727
800-356-1227
Fax: 800-926-2062

Computer Doctors
9204-B Baltimore Blvd.
College Park, MD 20740
301-474-3095

The Computer Industry Almanac
PO Box 600
Glenbrook, NV 89413
702-749-5053
Fax: 702-749-5864

Computer Maintenance Training
241 Boston Post Road W
Marlboro, MA 01752
508-624-7708
800-952-5977
Fax: 508-624-4179

Computer & Monitor Maintenance
6649-N1 Peachtree Ind. Blvd
Norcross, GA 30092
404-662-5633
800-466-4411
Fax: 404-662-5633

Computer Parts Unlimited*D
5321 Derry Avenue, Suite-F
Agoura Hills, CA 91301
818-879-1100
Fax: 818-879-1199

Computer Coverup, Inc.
2762 Clybourn Avenue
Chicago, IL 60614
312-327-9200
800-282-2541

Computer Power Inc.
124 W. High St.
High Bridge, NJ 08829
908-638-8000
800-526-5088
Fax: 908-638-4931

Computer Products Power Conversion
7 Elkins St
South Boston, MA 02127
617-464-6639
Fax: 617-464-6612

Computer Svcs of America*D
1050 Perimeter Road
Manchester, NH 03103
603-644-5005
800-255-7815
Fax: 603-644-4645

Computer Transaction Systems
15 Bayview St
PO Box 56
North Weymouth, MA 02191
617-331-6968
800-331-6968
Fax: 617-331-6969

Computer Connection
1101 W 80th
Minneapolis, MN 55420
612-884-0758
Fax: 612-884-2206

Computing Technology Ind. Assoc.
CTIA
450 E 22nd St
Lombard, IL 60148-6158
800-333-9532
Fax: 708-268-1384

Compuvideo
3861 Oceanview Ave.
Brooklyn, NY 11224
212-213-6818

Connector Corporation
4720 Yender Ave
Lisle, IL 60532
708-969-3400
Fax: 708-969-3545

Consolidated Elctrncs, Inc.*D
705 Watervliet Ave.
PO Box 20070
Dayton, OH 45420-0070
513-252-5662
800-543-3568
Fax: 513-252-4066

Contact East*D
335 Willow Street
PO Box 786
North Andover, MA 01845-5995
508-682-2000
800-225-5334
Fax: 508-688-7829

Controlled Power Co.
1955 Stephenson Highway
Troy, MI 48083
800-521-4792
Fax: 800-642-9625

Conway Engineering, Inc.
8393 Capwell Drive
Oakland, CA 94621-2113
510-568-4028
800-626-6929
Fax: 510-568-1397

Cook's Inst. of Elec. Engrg.
4251 Cypress Drive
Jackson, MS 39212
601-371-1351

Cooper Associates*D
112 Oakwood Road
McMurray, PA 15317
412-941-6473
Fax: 412-941-3410

Coordinated Service, Inc.
20 A Court St
Groton, MA 01450
508-448-3800
Fax: 508-448-0060

Core Software
26303 Oak Ridge Drive
Spring, TX 77380-1918
713-292-2177
Fax: 713-298-1492

Corporate Systems Center*D
1294 Hammerwood Avenue
Sunnyvale, CA 94089
408-734-3475
Fax: 408-745-1816

Cooper Tools
PO Box 30100
Raleigh, NC 27622
919-362-7510

CRC Components*D
186 University Parkway
Pomona, CA 91768
800-822-1272
800-858-4880 (DOM)
Fax: 909-594-4761

CRC Industries, Inc.
885 Louis Drive
Box C-5000
Warminster, PA 18974-0586
215-674-4300
800-556-5074
Fax: 215-674-2207

CRC Press, Inc.
2000 Corporate Blvd NW
Boca Raton, FL 33431
407-994-0555

Creative Logics Corporation
17W755 Butterfield Road
Oakbrook Terrace, IL 60181
708-261-1833 Ext 275
Fax: 708-627-3039

Creative Electronics
1417 N. Selfridge
Clawson, MI 48017
810-435-8916

CSI/SPCCO
1172 Route 109
Lindenhurst, NY 11757-0624
516-957-8700
800-645-5516
Fax: 516-957-9142

CSTS Inc.
1480 N. Lakeview Ave
Anaheim, CA 92807-1827
714-777-2787
Fax: 714-777-2360

CUI Stack
9640 S.W. Sunshine Ct,
Suite 700
Beaverton, OR 97005
503-643-4899
Fax: 503-643-6129

The Current Source*D
5159 Glenwood
Boise, ID 83714
208-323-9692
Fax: 208-323-9691

Curtis Mathes Parts & Service
10911 Petal
Dallas, TX 75238
214-494-6411
800-657-1979
Fax: 214-494-1585

Custom Components Corp*D
W224 S8445 Industrial Drive
Big Bend, WI 53103
414-662-5266
Fax: 414-662-3781

Company mailing addresses

Custom Data Associates
PO Box 10903
Baltimore, MD 21234
410-668-9594
800-451-0137
Fax: 410-661-3942

Cypress Information Resources
15466 Los Gatos Blvd #109-285
Los Gatos, CA 95032
408-354-4887
Fax: 408-354-5058

D

Dactronix
15681 Highway 72
Rolla, MO 65401-5827
314-364-0193

D&D Enterprises
27W937 Commercial Avenue
Barrington, IL 60010
708-381-0789
800-445-7949

Daetron
935 The Queensway
Postal Station U, Box 641
Toronto, ON
Canada M8Z 5Y9
416-676-1600

Dak Tech*D
4900 Ritter Road
Mechanicsburg, PA 17055
717-795-9544
800-325-3238
Fax: 717-795-9420

Dak Tech*D
4025 9th Avenue SW
Fargo, ND 58103
701-282-6686

Dalbani Corporation*D
4225 NW 72nd Avenue
Miami, FL 33166
305-716-1016
800-325-2264
Fax: 305-594-6588

Dalco Electronics*D
275 Pioneer Blvd
Springboro, OH 45066-1180
513-743-8042
800-445-5342
Fax: 513-743-9251

Dandy Mfg. Co.
2323 Gibson St.
Muskogee, OK 74403
918-682-4286

Dariana Software
5241 Lincoln Avenue,
Suite B5
Cypress, CA 90630
714-236-1380

Data Depot, Inc.
1710 Drew Street, Suite 1
Clearwater, FL 34615-6213
813-446-3402
800-275-1913
Fax: 813-443-4377

D.A.T.A.
15 Inverness Way East
PO Box 6510
Englewood, CO 80155-6510
303-799-0381
800-447-4666
Fax: 303-799-4082

Data-Basics Inc.
11000 Cedar Road
Cleveland, OH 44106
216-721-3400
800-837-7574
Fax: 216-721-2398

DataBasic
120 Judd St
Bristol, CT 06010
800-967-5924

Dataproducts Corporation
528 Route 13 South
Milford, NH 03055
603-673-9100
603-673-3091

Datatech Depot, Inc.
1871 North Miller St.
Anaheim, CA 92806
714-996-7500
Fax: 714-970-1670

Datatran Corp.
355 Yuma Street
Denver, CO 80223
303-778-0870

DAYTA-CO
PO Box 30191
Mesa, AZ 85275
602-835-2243
Fax: 602-835-2243

Dazor Manufacturing Corp.
4483 Duncan Avenue
St. Louis, MO 63110
314-652-2400
800-345-9103
Fax: 314-652-2400

DC Electronics
PO Box 3203
Scottsdale, AZ 85257
602-945-7736
800-423-0070
Fax: 602-994-1707

Delta Warranty
11201 SE 8th St, Ste 110
Bellevue, WA 98004
206-462-7773
800-733-3358
Fax: 206-450-1311

Deltron, Inc.
290 Wissahickon Ave.
North Wales, PA 19454
215-699-9261
800-523-2332
Fax: 215-699-2310

Den-On Instruments, Inc.
2580 Corporate Pl.,
Suite F-103
Monterey Park, CA 91754
213-266-5960
800-397-5966
Fax: 213-266-5963

Depot America
1340 Campus Parkway
Neptune, NJ 07753
800-648-6833

Desco Industries, Inc.
761 Penarth Avenue
Walnut, CA 91789
909-598-2753
Fax: 909-595-7028

DeVry
1 Tower Lane
Oak Brook Terr, IL 60181
708-571-7700

Diagsoft, Inc.
5615 Scotts Valley Drive
Suite 140
Scotts Valley, CA 95066
408-438-8247
Fax: 408-438-7113

Digi-Key D*
701 Brooks Ave. S.
Thief River Falls, MN 56701
218-681-6674
800-344-4539
Fax: 218-681-3380

Digitech Industries Inc.
P.O. Box 2267
55 Kenosia Ave
Danbury, CT 06813-2267
203-797-2676
Fax: 203-797-2682

Disk Technician Corp.
1940 Garnet Avenue
San Diego, CA 92109
619-274-5000

Diversified Case Co., Inc.
50 Harbor Point
Utica, NY 13502
315-797-2725
Fax: 315-797-5231

Diversified Parts*D
2114 S.E. 9th Ave.
Portland, OR 97214
503-236-6140
800-379-7737
Fax: 800-373-2987

Dolch American Instruments Inc
372 Turquoise St
Milpitas, CA 95035
408-957-6575
800-538-7506
Fax: 404-435-8260

Dot Shop, The
12025 NE Summer St.
Portland, OR 97220
503-256-7585
800-487-6025
Fax: 503-256-7588

Dow U.S.A.
2020 Willard H. Dow Center
Midland, MI 48674
800-447-4369

R.L. Drake Company
P.O. Box 112
Miamisburg, OH 45342
513-866-2421

Dranetz Technologies, Inc.
1000 New Durham Road
PO Box 4019
Edison, NJ 08818-4019
908-287-3680
800-DRANTEC
Fax: 908-248-1834

Dremel
4915 21st Street
Racine, WI 53406
414-554-1390
800-437-3635
Fax: 414-554-7654

Dynaloy, Inc.
7 Great Meadow Lane
Hanover, NJ 07936
201-887-9270
Fax: 201-887-3678

Dynamic Learning Systems
PO Box 805
Marlboro, MA 01752
508-366-9487
Fax: 508-898-9995

E

Eagan Technical Services, Inc.
1380 Corporate Center Curve,
Suite 107
Eagan, MN 55121
612-688-0098
800-285-1873
Fax: 612-688-7829

East Coast Transistor*D
2 Marlborough Road
West Hemstead, NY 11552
516-483-5742
800-645-3516
Fax: 800-733-5904

Echelon Industries*D
20681 E. Truss Court
Walnut, CA 91789
714-594-1891
Fax: 714-598-3810

Edroy Products
P.O. Box 988
Nyack, NY 10960
914-358-6600
800-223-8803

EFI Electronics Corporation
2415 South 2300 West
Salt Lake City, UT 84119
800-729-3496
Fax: 801-977-0200

Eico Electronics
363 Merit Road
Lynnbrook, NY 11563
516-599-5744

Eiger Electronics*D
70A E. Jefryn Blvd.
Deer Park, NY 11729
516-242-2583
800-835-8316
Fax: 516-242-2586

E.I.L. Instruments, Inc.*D
10946A Golden West Drive
Hunt Valley, MD 21031-1320
410-584-7400
Fax: 410-584-7561

Electro Insulation Corporation
3921 Ventura Drive
Arlington Heights, IL 60004
312-632-1020
800-247-2114
Fax: 312-632-1089

Electro Tool, Inc.
9103 Gilman
Livonia, MI 48150

Electrodyn, Inc.
501 E. Temperance St.
Ellettsville, IN 47429
812-876-2522
800-937-1023
Fax: 812-876-2533

Electro Dynamics, Inc.*D
EDI
135 Eileen Way
Syosset, NY 11791-9022
516-496-400
800-426-6423
Fax: 800-873-2948

Electromatic Controls/
Soar Instruments
2495 Pembroke Ave.
Hoffman Estates, IL 60195
708-882-5757
800-222-2659
Fax: 708-882-7234

Electro Standards Lab, Inc.
Data Comm Prods Div
36 Western Industrial Drive
Cranston, RI 02921
401-943-1164
Fax: 401-946-5790

Electro-Metrics, Incorporated
A Penril Corporation
231 Enterprise Road
Johnstown, NY 12095
518-762-2600

Electron Processing
P.O. Box 68
Cedar, MI 49621
616-228-7020

Electronic Inst. of Brooklyn
4823 Avenue N
Brooklyn, NY 11234

Electronic Design Specialists
4647 Appalachian St
Boca Raton, FL 33428
407-487-6103

EIA/CEMA Product Services
2500 Wilson Blvd
Arlington, VA 22201
703-907-7670
Fax: 703-841-0030

Electronic Prod. Specialties*D
N50 W13740-B Overview Dr
Menomonee Falls, WI 53051
414-783-6300
800-783-3337
Fax: 414-783-6707

Electronic Parts Supply*D
4071 Emery Street
Emeryville, CA 94608
510-420-1040

Electronic Software Developers
826 South Main Street
South Farmingdale, NY 11735
516-221-6404
800-621-8477 (TIPS)

Electronic Specialists, Inc.
171 South Main Street
Natick, MA 01760
508-655-1532
800-225-4876
Fax: 508-653-0268

Electronic Systems
624 Cedar St.
Rockford, IL 61101
815-968-1040
Fax: 815-962-1495

Electronics Warehouse Corp.*D
1908 Coney Island Ave.
Brooklyn, NY 11230
718-375-2700
800-221-0426
Fax: 718-375-2796

Electronix Corp.*D
313 West Main Street
Fairborn, OH 45324-5036
513-878-1828
800-223-3205
Fax: 513-878-1972

Electro-Tech Systems, Inc.
115 East Glenside Avenue
Glenside, PA 19038
215-887-2196

Electronix Express*D
365 Blair Road
Avenel, NJ 07001
908-381-8020
800-972-2225
Fax: 908-381-1572

Electroservice Laboratories
6085 Sikorsky St.
Ventura, CA 93003
805-644-2944
800-336-4ESL
Fax: 805-644-5006

Elenco Electronics, Inc.
150 West Carpenter Avenue
Wheeling, IL 60090
708-541-3800
Fax: 708-520-0085

Elgar Corp.
9250 Brown Deer Road
San Diego, CA 92121
619-450-0085
800-733-5427
Fax: 619-458-0267

C.H. Ellis Company, Inc.
2432 Southeastern Ave.
Indianapolis, IN 46201
317-636-3351
800-466-3351
Fax: 317-635-5140

Eltrex Industries Inc.
65 Sullivan St.
Rochester, NY 14605
716-454-6100 X222
Fax: 716-263-7766

Elvo Division of
Zumbach Electronics Corp.
140 Kisco Ave.
Mount Kisco, NY 10549-1407
914-241-1008

Emerson Radio Corp.
One Emerson Lane
North Bergen, NJ 07047
201-854-4800
800-695-0095 Order

E.M.T. Parts, Inc.*D
2031 East Via Burton St.
Suite J
Anaheim, CA 92806
714-758-8769
800-448-7892
Fax: 714-758-8768

Emulation Technology, Inc.
2344 Walsh Ave., Building F
Santa Clara, CA 95051
408-982-0660
Fax: 408-982-0664

Entech Corp
2486 Dunwin Drive
Mississauga, ON
Canada L52 1J9
905-820-3030

Equus C/O Unistar
13562 Pawnee
Tustin, CA 92680
714-730-7936

The Eraser Company, Wybar Div.
Oliva Drive
PO Box 4961
Syracuse, NY 13221
315-454-3237
800-724-0594
Fax: 315-454-3090

ESP Inc.
14 Blackstone Valley Place
Lincoln, RI 02865
401-333-3800
800-338-4353
Fax: 401-333-4954

Essential Seminars
297-101 Kinderkamack Road
Suite 122
Oradell, NJ 07649
201-986-1678
Fax: 201-986-1679

EURAS USA, Inc.
501 Sycamore Street,
Suite 300
Waterloo, IA 50703-4643
319-236-2000
800-453-8727
Fax: 319-236-2020

Electronic Technicians Assn.
602 N. Jackson
Greencastle, IN 46135
317-653-8262
800-288-3824
Fax: 317-653-8262

Excel Distributing*D
1819 Mentor Ave
Cincinnati, OH 45212
513-531-3989
800-733-3329
Fax: 513-735-8007

Extech Instruments Corp.*D
335 Bear Hill Road
Waltham, MA 02154
617-890-7440
Fax: 617-890-7864

E-Z Hook
225 North Second Avenue
PO Box 450
Arcadia, CA 91066
818-446-6175
Fax: 818-466-0972

F

Fairway Electronics*D
4210 Howard Ave.
Kensington, MD 20895
301-564-1440

The Fax Doctor
85 West Wilmot St.
Richmond Hill, ON
Canada L4B 1K7
905-882-0700
800-265-0700

Falcon Safety Products
25 Chubb Way
Branchburg, NJ 08876
908-707-4900
Fax: 908-707-8855

Fedco Electronics, Inc.*D
PO Box 1403
Fond Du Lac, WI 54936
414-922-6490
Fax: 414-922-6750

Federal Warranty Service Corp.
919 North Michigan Avenue
Suite 3202
Chicago, IL 60611
312-944-6161
Fax: 312-944-8966

Fessenden Technologies
116 3rd Street
Ozark, MO 65721
417-485-2501
Fax: 417-485-3133

Fiber Options, Inc.
80 Orville Drive
Bohemia, NY 11716-2506
516-567-8320

Fieldpiece Instruments
231 East Imperial Highway
Suite 250
Fullerton, CA 92635
714-992-1239
Fax: 714-992-6541

Fifth Generation Systems
10049 North Reiger Road
Baton Rouge, LA 70809-4562
504-291-7221

Fluke Corporation
PO Box 9090 M/S 250E
Everett, WA 98206-9090
206-347-6100
800-44-FLUKE
Fax: 206-356-5116

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6301 Equitable Road
Kansas City, MO 64120-1395
816-483-6400
800-821-3452
Fax: 816-483-5010

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10725 Ambassador Drive
Kansas City, MO 64153
816-891-1040
Fax: 816-891-8018

Fotec Inc
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Boston, MA 02129
617-241-7810
800-537-8254
Fax: 617-241-8616

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PO Box 708
Medford, MA 02155
617-665-1400
800-996-3837
Fax: 617-665-0780

Company mailing addresses

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Los Angeles, CA 90011
213-588-7166
800-243-6264
Fax: 213-582-6226

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Bedford Heights, OH 44146
216-439-8500
800-321-6993
Fax: 800-445-7991

Franks Electronics*D
PO Box 357
Glen, MS 38846
601-287-1594

R. Frazier Inc.*D
1300 Intervale Drive
Salem, VA 24153
703-387-3799
Fax: 703-387-1180

Frederick Engineering, Inc.
10200 Old Columbia Rd.
Columbia, MD 21046
410-290-9000
Fax: 410-381-7180

G

Galco Industrial Electronics*D
26010 Pinehurst Drive
Madison Hts., MI 48071-4189
810-542-9090
800-827-8902
Fax: 810-542-8031

GC Electronics*D
A Division of GC Thorsen Co.
1801 Morgan Street
Rockford, IL 61105-1209
815-968-9661
800-443-0852
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Norcross, GA 30071
404-263-5984
800-431-7671
Fax: 404-263-5780

GE Consumer Service
4421 Bishop Lane
Louisville, KY 40218
800-572-2455

Geist Inc.
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Lincoln, NE 68501
402-474-3400
800-432-3219
Fax: 402-474-4369

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103 Mensing Way
Cannon Falls, MN 55009
507-263-3957
800-533-3631
Fax: 507-263-3129

General Power Systems, Inc.
17881 Cartwright Road
Irvine, CA 92714
714-851-0800
Fax: 714-851-1181

Genicom Corporation
1 Genicom Drive
Waynesboro, VA 22980-1999
800-535-4364
Fax: 703-949-1500

GEnie Services
C/O Radio & Electronics
21 Madison Plaza #149
Madison, NJ 07940-2354
800-638-8369

Genstar/Electro Rent
6060 Sepulveda Blvd
Van Nuys, CA 91411
818-787-2100
Fax: 818-786-4354

Geotest, Inc
18242 McDurmott St Suite A
Irvine, CA 92714
714-263-2222
800-886-1201
Fax: 714-263-1203

Gibson Research Corp.
35 Journey
Aliso Viejo, CA 92653
714-362-8800
800-736-0637
Fax: 714-830-0300

Global Communications, Inc.
Global One Center
472 Capital Circle NW
Tallahassee, FL 32304
904-574-6633
800-659-8659
Fax: 904-574-6663

Global Kitting
P.O. Box 1757
Roseburg, OR 97470
503-672-5332
Fax: 503-672-0614

Global Micro-Parts Depot*D
11151 Denton Drive
Dallas, TX 75229
214-241-9470
800-325-8488
Fax: 800-433-2060

Global Specialties
A Division of Interplex
PO Box 1942
New Haven, CT 06509
203-624-3103
800-345-6251
Fax: 203-468-0060

GlobeTech International, Inc.
1684 S. Research Loop
Tucson, AZ 85710
602-298-6900
800-654-7314
Fax: 602-298-1913

Goldstar Products Company
14555 N Hayden Rd,
Suite 101
Scottsdale, AZ 85260
602-922-3922
800-541-6808

Good-Lyddon Data Systems
6879 Sard Street
Rancho Cucamonga, CA 91701
909-980-4563

Gore Laboratories, Inc.
3 Northern Blvd
Amherst, NH 03031
606-672-4673
Fax: 603-672-5652

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Valley View, OH 44125
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800-468-5365
Fax: 216-328-7404

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Old Post Road
Brookfield, VT 05036
802-276-3162
802-276-3837

The Granite Corp.
24200 Burbank Blvd.
Woodland Hills, CA 91367
818-887-5533
Fax: 818-883-5188

Greenlee Textron, Inc.
4455 Boeing Drive
Rockford, IL 61109
815-397-7070
Fax: 815-397-8289

Guardian Computer Support, Inc
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Pleasanton, CA 94566
510-846-3649
800-752-8733 X102

H

Willi Hahn Corp U.S.A.
1400 East Broadway
PO Box 960
Monticello, MN 55362
612-295-2162
800-328-8310
Fax: 612-295-4440

American Hakko Products
25072 Anza Drive
Santa Clara, CA 91355
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Fax: 805-294-0096

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266 East Meadow Avenue
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800-247-1241
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Aberdeen, MD 21001
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800-638-7616
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Twinsburg, OH 44087
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Fax: 216-425-4328

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Fax: 616-982-5577

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St. Joseph, MI 49085

Herman Electronics*D
7350 N.W. 35th Terrace
Miami, FL 33122
305-477-0063
800-938-4376
Fax: 800-938-4377

Hewlett-Packard
1501 Page Mill Road
Palo Alto, CA 94304

Hewlett-Packard Company
Personal Measurememts Operation
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719-590-2053
719-590-1900
Fax: 719-590-2193

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Roselle Park, NJ 07024
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Fax: 908-245-6176

High Tech Electronic Services
1623 Aviation Boulevard
Redondo Beach, CA 90278
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800-289-3001
Fax: 310-379-9608

Higher Intelligence Software
60 Farmington Lane
Melville, NY 11747
516-643-7740
800-215-5081

Highland Products, Inc.
P.O. Box 794
Dover, NJ 07801
201-366-0156
Fax: 201-366-6665

Richard Hirschmann of America
Industrial Row Box 229
Riverdale, NJ 07457
201-835-5002
Fax: 201-835-8354

Hitachi Denshi America Ltd.
371 VanNess Way
Suite 120
Torrance, CA 90501
310-328-6116
Fax: 310-328-6252

Hitachi Home Electronics
905 E South Street
Anaheim, CA 92805
213-537-8383 X509
800-369-0422

Hitachi Service Company
3890 Steve Reynolds Blvd.
Norcross, GA 30093
770-279-5600
800-241-6558
Fax: 770-279-5692

High Tech Electronics
203 Highway 79N
Henderson, TX 75652
903-657-6320
Fax: 903-655-0280

Hi-Techniques, Inc.
2515 Frazier Ave
Madison, WI 53713
608-221-7500
Fax: 608-221-7509

HI-TEK Services, Inc.
32950 Alvarado-Niles Rd
Union City, CA 94587
510-489-8909
800-285-3508
Fax: 510-489-5908

HMC - Hub Material Co.*D
33 Springdale Avenue
Canton, MA 02021
617-821-1870
Fax: 617-821-4133

Hosfelt Electronics, Inc.*D
2700 Sunset Boulevard
Steubenville, OH 43952
614-264-6464
800-524-6464
Fax: 614-264-5414

Howard Electronic Insts Inc.*D
6222 North Oliver
Wichita, KS 67220
316-744-1984
800-394-1984
Fax: 316-744-1994

Hunter Products, Inc.
792 Partridge Drive
PO Box 6795
Bridgewater, NJ 08807
908-526-8440
800-524-0692
Fax: 908-526-8348

Huntron Instruments, Inc.
15720 Mill Creek Blvd
Mill Creek, WA 98012
206-743-3171
800-426-9265
Fax: 206-743-1360

Hy Tec Dealer Service
4548 Parkbreeze Ct
Orlando, FL 32801
407-297-1001
Fax: 407-297-4310

Hy-Tronix Instruments, Inc.
P.O. Box 827
Newton, KS 67114
316-283-5730
Fax: 316-283-6662

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I.A.C. Industries
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Brea, CA 92621
714-990-8997
Fax: 714-990-0557

ICM Components*D
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Santa Monica, CA 90401
310-260-1444

IBM Education
1500 Riveredge Parkway
Marietta, GA 30067
770-644-4059

IC Master
Hearst Business Pub./UTP Div
645 Stewart Avenue
Garden City, NY 11530
516-227-1314
Fax: 516-227-1453

ICS Inc., Electro-Pac Div.
520 Interstate Road
Addison, IL 60101
708-543-6244
Fax: 708-543-6244

Ideal Computer Systems
206 Collins Road, NE
Cedar Rapids, IA 52402
319-373-2001

Ideal Industries, Inc.
117 Fern St.
Santa Cruz, CA 95060
408-427-3122
Fax: 408-427-3134

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534 W. Main St.
Westbury, NY 11590
516-334-5959
800-899-8438
Fax: 516-334-5988

Image Network, Inc.
2001 Ruppman Plaza
Peoria, IL 61614

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10435 Burnet Rd Suite 114
Austin, TX 78758
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Fax: 512-832-9321

Independent Dealer Services
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260 Railroad Ave.
Hackensack, NJ 07601
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800-4-HURLEY
Fax: 714-971-5033

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Grand Rapids, MI 49512
616-698-8688
800-253-4623
Fax: 616-698-9080

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416 Stewart Hollow Road
Portsmouth, OH 45662
614-574-4304
Fax: 614-574-4304

Instek Corp.*D
1205 John Reed Court
City of Industry, CA 91745
818-336-6537
Fax: 818-369-1748

Integrity Design & Research
296 West Ferry Street
Buffalo, NY 14213
716-885-0011
Fax: 716-882-9699

Intelligent Business Solutions
1720 Jane Ave S
Minneapolis, MN 55403
612-377-4819

Intellisystems
10930 Fullbright
Chatsworth, CA 91311
818-341-1634

Interactive Image Technologies
111 Peter St Suite 801
Toronto, ON
Canada M5V2H1
416-977-5550
Fax: 416-977-1818

Intermatic Incorporated
Intermatic Plaza
Spring Grove, IL 60081
815-675-2321
312-282-7300

Intn'l Correspondence Schools
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Scranton, PA 18515
717-347-1625
Fax: 717-343-8172

Internat'l Components Corp.*D
107 Maxess Road
Melville, NY 11747
516-293-1500
800-645-9154
Fax: 516-293-4983

International Disk Svcs, Inc.
1530 Montague Expwy
San Jose, CA 95131
408-432-0537
Fax: 408-434-1015

International Power Tchnlgies
538 South 1400 West
Orem, UT 84058
801-224-4828

Interplex Electronics, Inc.
70 Fulton Terrace
New Haven, CT 06512
203-466-6103
Fax: 203-468-0060

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2708 W. Berry
Fort Worth, TX 76109
817-921-9101
Fax: 817-921-3741

Isles Industries
895 Beacon Street
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714-990-8997

ITT Power Systems Corporation
3400 East Britannia,
Suite 122
Tucson, AZ 85706
602-889-7600
Fax: 602-294-1808

ITT Pomona Electronics
1500 East Ninth Street
PO Box 2767
Pomona, CA 91766
909-623-3463
Fax: 909-629-3317

J

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1355 Shoreway Rd.
Belmont, CA 94002
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800-831-4242
Fax: 415-592-2503

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19831 Magellan Drive
Torrance, CA 90502-2033
310-327-7440
800-421-2716
Fax: 310-327-5405

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San Jose, CA 95124
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800-538-5000
Fax: 408-559-0250

JDV Products Inc.
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Fair Lawn, NJ 07410
201-796-1720
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Fax: 202-832-3411

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7815 South 46th Street
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Fax: 415-592-2503

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139 E. Arrow Hwy
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909-599-6090
Fax: 909-592-9960

Jonard Industries Corp.
134 Marbledale Rd.
Tuckahoe, NY 10707
914-793-0700
Fax: 914-793-4527

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Niles, IL 60714
847-297-4200
800-323-5925
Fax: 800-446-8366

K

Kalglo Electronics Co., Inc.
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Bethlehem, PA 18017-9348
610-837-0700
800-524-0400
Fax: 610-837-7978

KDM Associates
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Lemont, IL 30439
708-739-3337
800-536-6160
Fax: 708-739-9169

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800-552-1115
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708-297-1600
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Fax: 708-390-9338

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Cypress, CA 90630
714-893-1111
Fax: 714-893-7997

Keystone Electronics Corp.
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Key Tek Instrument Corp.
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Fax: 508-657-4803

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Chicago, IL 60659-9033
708-677-9500

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Dayton, OH 45439
513-298-8244

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5882 Rich Hill Way
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714-579-1276

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Clearwater, FL 34616
813-443-1331
800-683-6696
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Kansas City, MO 64116
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800-786-8897
Fax: 816-421-8053

L-Com Inc.
1755 Osgood Street
North Andover, MA 01845
508-682-6936
800-343-1455
Fax: 508-689-9484

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380 Oser Avenue
Hauppauge, NY 11788
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800-645-5104
Fax: 516-231-5295

Leads Metal Products (ENDECO)
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Indianapolis, IN 46244-1186
317-631-7200
Fax: 317-261-1208

LeCroy Corporation
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914-425-2000
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Leland Ltd., Inc.
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908-668-1008
Fax: 908-668-7716

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6643 West Mill Road
Milwaukee, WI 53218
414-353-0711
Fax: 414-353-0733

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Chula Vista, CA 91911
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Fax: 619-284-4567

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Newark, DE 19713
302-369-1590, 1, 2,3
800-627-8755
Fax: 302-369-1594, 1595

LG Precision
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Cerritos, CA 90703-2226
310-404-0101
Fax: 310-921-6227

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Holliston, MA 01746
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Fax: 508-626-0353

Luxo Corp.
36 Midland Ave.
Port Chester, NY 10573
914-937-4433
800-222-5896
Fax: 914-937-7016

M

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15806 Midway Road
Dallas, TX 75244
214-386-6100
Fax: 214-404-1957

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One Apple Tree Square
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Bloomington, MN 55425
800-762-2241
800-762-2241
Fax: 800-232-4941

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28 Willow Pond Way
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Fax: 716-377-9573

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Mahwah, NJ 07430
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Fax: 201-529-2955

Magnetic Data Inc.
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Eden Prairie, MN 55344
800-328-3441

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5736 N. Michigan Rd.
Indianapolis, IN 46208-1729
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Fax: 317-257-1590

The Malcom Company
25 Abbot St.
Andover, MA 01801
800-289-7505
Fax: 508-475-7242

Main Source Electronics
9260 Owensmouth Ave
Chatsworth, CA 91311
818-882-7500
800-882-1238
Fax: 818-882-7785

Manhattan/CDT
Cole-Flex
203 Progress Drive
Manchester, CT 06040
860-643-3547
800-228-6322
Fax: 860-643-3556

Marconi Instruments
3 Pearl Court
Allendale, NJ 07401
201-939-9050
800-233-2955
Fax: 201-934-9229

Marketing Concepts, Inc.
A Div. of Ind. Dlr. Svcs.
2600 Washington
St. Louis, MO 63188
314-727-2901
Fax: 314-727-2046

Marshall Industries*D
9320 Telstar Ave.
El Monte, CA 91731
818-307-6000

M.A.T. Electronics*D
400 Pike Road
Huntingdon, PA 19061
215-364-7667
800-628-1118
Fax: 800-628-1005

Matrix Components
13581 Pond Springs Rd,
Suite 315
Austin, TX 78729
512-258-7590
800-726-1503
Fax: 512-219-0021

MaxServe
8317 Cross Park Drive
Suite 350
Austin, TX 78754
512-328-3939
Fax: 512-328-3625

McAfee Associates, Inc.
2710 Walsh Avenue,
Suite 200
Santa Clara, CA 95051
408-988-3832

MCD Electronics *D
2301 Yale S.E. Unit A5
Albuqurque, NM 87106
505-246-8000
800-949-4623
Fax: 505-246-9101

MCG Electronics
12 Burt Drive
Deer Park, NY 11729
516-586-5125
800-851-1508
Fax: 516-586-5120

McGraw-Hill
Professional Book Group
13311 Monterey Ave
Blue Ridge Summit, PA 17294-0850
717-794-2191
800-233-8158 Order
Fax: 717-794-2080

MCM Electronics*D
650 Congress Park Drive
Dayton, OH 45459-4072
513-434-0031
800-543-4330
Fax: 513-434-6959

Meirick, Inc.
420 South Hickory
Mount Vernon, MO 65712
417-466-3941

Melmat Inc *D
5333 Industrial Drive
Huntington Beach, CA 92649
714-379-4555
800-MELMAT-9
Fax: 714-379-4554

Meltek, Inc.
3 Victor Square
Scotts Valley, CA 95066
408-438-4986
Fax: 408-438-3459

Mendelson Electronics*D
340 East First Street
Dayton, OH 45402
513-461-3525
Fax: 800-344-6324

Mendon Electronics Corp.
3800 Monroe Ave.
Pittsford, NY 14534
716-248-8480
800-227-6937
Fax: 716-248-3021

Mercer Electronics
859 Dundee Avenue
Elgin, IL 60120-3090
708-697-2260
708-697-2272
Fax: 708-697-2272

Merlin Software
15735 Barranca Pkwy,
Suite B108
Irvine, CA 92718
714-453-9563
Fax: 714-753-0501

Mesa Systems, Inc.
5729 Sonoma Dr Suite G
Pleasanton, CA 94566-7782
510-462-9491
Fax: 510-462-8752

METCAL
1530 O'Brien Drive
Menlo Park, CA 94025
415-325-3291
800-776-1778
Fax: 415-325-5932

Metric Supply*D
21029 Itasca Street, Unit C
Chatsworth, CA 91311-4924
818-701-7518
800-289-8953
Fax: 818-701-6011

Metrix Inc.
20975 Swenson Drive
Waukesha, WI 53186
414-798-8560
800-543-2130
Fax: 414-798-8573

Metrotek Industries, Inc.
33 West Main Street
Elmsford, NY 10523-2413
914-347-4112
Fax: 914-347-4203

M.I. Technologies
3310 E. Peterson Road
Troy, OH 45373
513-335-4560
Fax: 513-339-6344

Micro 2000, Inc.
1100 East Broadway,
Suite 301
Glendale, CA 91205
818-547-0125
800-864-8008
Fax: 818-547-0397

Micro Medics
6625 Jarvis
Niles, IL 60714
708-647-1010
800-678-5300

Micro Care Corp.
34 Ronzo Road
Bristol, CT 06010
860-585-7912
800-638-0125
Fax: 860-585-7378

Microcode Engineering
573 West 1830 North,
Suite 4
Orem, UT 84057
801-226-4470
800-419-4242
Fax: 801-226-6532

Micro Data
3001 Executive Dr #270
Clearwater, FL 34622-2260
813-539-8600
800-539-0123
Fax: 813-531-0977

Micro Dimensions, Inc.*D
89K Washington Ave.
Natick, MA 01760
508-650-9008
Fax: 508-650-9207

Microdoc*D
2635 Capitol
Eugene, OR 97403
503-344-5335

Micro Electronic Systems, Inc.
3 Quarry Road
Brookfield, CT 06804
203-775-1440
800-243-7254

Micro Mart, Inc.*D
159 State Road
Buzzard's Bay, MA 02532
508-833-2225
Fax: 508-888-2157

Micromax Corp.
411 South London Avenue
Egg Harbor City, NJ 08215

Micron Meters
4509 Runway Street
Simi Valley, CA 93063
805-522-0683
800-638-3770
Fax: 805-522-1568

Micro Semi
Power Technology Components
2830 S Fairview Street
Santa Ana, CA 92704-5948
714-979-8220
Fax: 714-557-5989

Microwave Filter Company, Inc.
6743 Kinne Street E.
East Syracuse, NY 13057
315-437-3953
800-448-1666
Fax: 315-463-1467

Mid America Company
2309 South Archer
Chicago, IL 60616

Miller-Stephenson Chemical Co.
PO Box 950
Danbury, CT 06813
203-743-4447
800-992-2424
Fax: 203-791-8702

Mindshare, Inc.
2202 Buttercup Drive
Richardson, TX 75082
214-231-2216
Fax: 214-783-4715

Minitool, Inc.
634 University Ave.
Los Gatos, CA 95030-4416
408-374-1585

Minuteman UPS
P.O. Box 815-188
Dallas, TX 75381
214-446-7363
800-238-7272
Fax: 214-446-9011

Module Exchange
706 Space Way
Duncanville, TX 75137
214-298-1212
800-632-6637
Fax: 214-283-1778

Monitech
46 Graphic Place
Moonachie, NJ 07074
800-332-9349
Fax: 201-933-5301

Monroe Electronics, Inc.
100 Housel Ave.
Lyndonville, NY 14098
716-765-2254
800-821-6001
Fax: 716-765-9330

Montgomery Ward
1 Montgomery Ward Plaza
Location 4S
Chicago, IL 60671
312-467-3248
Fax: 312-467-2731

Montgomery Ward*D
National Parts Center
5750 McDermott Ave.
Berkeley, IL 60163
800-323-1965
Fax: 800-215-3767

Moody Tools, Inc.
42-60 Crompton Ave.
East Greenwich, RI 02818
401-885-0911
800-866-5462
Fax: 401-885-4565

Moore Business Products
3901 Morse
Denton, TX 76205
817-566-8646

Mouser Electronics*D
2401 Highway 287 N.
Mansfield, TX 76063
817-483-4422
800-346-6873
Fax: 817-483-0931

M-Test Equipment
P.O. Box 460220
San Francisco, CA 94146
415-882-4100
800-334-4293
Fax: 415-882-1988

Mueller Electric Company
1583 E. 31st St.
Cleveland, OH 44114-4354
216-771-5225
800-955-2629
Fax: 216-771-3068

Multicore Solders
1751 Jay Ell Drive
Richardson, TX 75081
214-238-1224
Fax: 214-437-0288

Multidyne
191 Forest Ave
Locust Valley, NY 11560
516-671-7278
800-4TV-TEST
Fax: 516-671-3362

Multiplex Technology, Inc.
3200 East Birch Street
Brea, CA 92621-6258
714-996-4100
800-999-5225
Fax: 714-996-4900

Multiverse Communications
148 West 77th Street,
Suite 3A
New York, NY 10024
704-522-6183

N

National Advancement Corp.
2730-J South Harbor
Santa Ana, CA 92704
714-754-7110
800-832-4787
Fax: 714-754-7166

Nat'l Assoc. of Svc Dealers
Division of NARDA
10 E 22nd St
Lombard, IL 60148
708-953-8950
800-621-0298
Fax: 708-953-8957

National Parts Depot*D
31 Elkay Drive
Chester, NY 10918
914-469-4800
Fax: 914-469-4855

National Technical Schools
PO Box 1548
La Canada, CA 91012-5548

National Electronics Warranty
44873 Falcon Place,
Suite 174
Sterling, VA 22170

National Instruments
6504 Bridge Point Parkway
Austin, TX 78730-5039
512-794-0100
800-433-3488
Fax: 512-794-8411

NATM
1 Penn Plaza
New York, NY 10119
212-239-7222

NCM Electronics
20393 Kent Way
Los Gatos, CA 95030-9112
408-496-0290
Fax: 408-496-0388

NEC Technologies, Inc.*D
1255 Michael Drive
Wood Dale, IL 60191
708-860-9500
800-366-3632

Nederman, Inc.
6100 Hix Road
Westland, MI 48185
313-729-3344

Neptune Electronics*D
PO Box 245495
Brooklyn, NY 11224
800-242-5556
800-239-6349

NESDA
2708 W. Berry
Fort Worth, TX 76109
817-921-9061
Fax: 817-921-3741

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1275 Danner Drive
Aurora, OH 44202
216-562-7070
800-742-8324
Fax: 216-562-1999

P.K. Neuses*D
1401 Rohlwing Rd.
Rolling Meadows, IL 60008
708-253-6555
Fax: 708-253-6652

M.M. Newman Corporation
24 Tioga Way
PO Box 615
Marblehead, MA 01945
617-631-7100
Fax: 617-631-8887

Newport Electronics, Inc.
2229 South Yale Street
Santa Ana, CA 92704-4426
714-540-4914
800-639-7678
Fax: 714-546-3022

Nikko
AVS Technologies
2100 Trans-Canada
Highway S
Montreal, PQ
Canada H9P 2N4
514-683-1771
Fax: 514-683-5307

Nintendo America
4820 150th Avenue NE
Redmond, WA 98052
206-882-2040

Nippon America, Inc.*D
9600 NW 12th Street
Miami, FL 33172

Nippon Shokuhin Sangyo USA Ltd
861 Hinckley Rd
Burlingame, CA 94010
415-697-1558
800-366-4677
Fax: 415-697-2890

Northeast Electronics Inc.*D
6 Wilkins Drive #207
Plainville, MA 02762
508-699-6935
Fax: 508-695-9694

NorthStar MatrixServ
7101 31st Avenue N
Minneapolis, MN 55427
612-591-0009
800-969-0009
Fax: 612-591-0029

NRI Training for Professionals
McGraw-Hill Continuing
Education Center
4401 Connecticut Ave. NW
Washington, DC 20008

NRI School of Electronics
4401 Connecticut Ave., N.W.
Washington, DC 20008
202-244-1600
Fax: 202-244-2047

NTE Electronics, Inc.*D
44 Farrand Street
Bloomfield, NJ 07003
201-748-5089
800-631-1250
Fax: 201-748-6224

Nu-Concept Systems
P.O. Box 587
Colmar, PA 18915
215-822-8400
800-762-4278
Fax: 215-822-1427

Nutronix Inc.
P.O. Box 77103
Sterling Heights, MI 48077
313-726-1278
Fax: 313-726-9150

O

O.C. White
Bridge St./PO Box 128
Three Rivers, MA 01810
413-289-1751
Fax: 413-289-1754

Odem, Inc.
Instrumentation Division
PO Box 666
Ephrata, PA 17522
717-738-2330

The Ogment Group
PO Box 781
Lafayette, CA 94549
415-284-7372
415-284-4142

OHM/Electronics
746 Vermont Avenue
Palatine, IL 60067

O.K. Industries, Inc.
4 Executive Plaza
Yonkers, NY 10701
914-969-6800
Fax: 914-969-6650

Oldaker Corp.
301 N. Main St.
Dunkirk, OH 45836
419-759-3551
Fax: 419-759-3312

Omega Engineering, Inc.
One Omega Drive
PO Box 4047
Stamford, CT 06907-4047
203-359-1660
800-826-6342
Fax: 203-359-7990

Omnitron Electronics*D
280 North Midland Ave.
Saddle Brook, NJ 07662
201-703-9800
800-379-6664
Fax: 201-703-9804

Ontrack Computer Systems
6321 Bury Drive
Eden Prairie, MN 55346
612-937-1107
800-752-1333
Fax: 612-937-5815

Ontrack Data Recovery, Inc.
6321 Bury Drive,
Suites 13-21
Eden Prairie, MN 55346
612-937-5161
800-872-2599
Fax: 612-937-5750

OPTOelectronics Inc.
5821 NE 14th Avenue
Fort Lauderdale, FL 33334
305-771-2050
800-327-5912
Fax: 305-771-2052

OTI International
319 North Main Street
PO Box 194
West Point, NE 68788
402-372-5650

ORA Electronics
9410 Owensmouth Ave.
Chatsworth, CA 91311
818-772-2700
Fax: 818-718-8626

Orion Instruments, Inc.
1376 Borregas Ave
Sunnyvale, CA 94089-1004
408-747-0440
800-729-7700
Fax: 408-747-0688

P

PACE, Inc.
9893 Brewers Court
Laurel, MD 20723-1990
301-490-9860
Fax: 301-498-3252

Pacer Industries, Inc.
1450 First Ave.
Chippewa Falls, WI 54729
715-723-1141
800-283-1141
Fax: 715-723-7890

Panamax, Inc.
150 Mitchell Blvd.
San Rafael, CA 94903
415-499-3900
800-472-5555
Fax: 415-472-5540

Panasonic Industrial Co.
Two Panasonic Way
Secaucus, NJ 07094
201-348-7000

PanaVise Products
1485 Southern Way
Sparks, NV 89431
702-353-2900 EXT19
800-759-7535
Fax: 702-353-2929

Parts Express*D
340 East First Street
Dayton, OH 45402
513-222-0173
800-338-0531
Fax: 513-222-4644

Parts Port*D
1801 Walthall Cr Dr
Colonial Heights, VA 23834
804-733-0591
800-253-0515
Fax: 800-253-5640

Patco Service, Inc.
2515 Glencoe Road
Baltimore, MD 21234
410-444-4010
Fax: 410-254-9566

PC Instruments Incorporated
9261 Ravenna Road,
Bldg B11
Twinsburg, OH 44087
216-963-0800
Fax: 216-425-1590

PC Service Source*D
2350 Valley View Lane
Dallas, TX 75234
214-406-8583
800-727-2787
Fax: 214-406-9081

PD Software
7320 Louetta Rd
Spring, TX 77379
713-370-0600

The Peak Technologies Group
9200 Berger Rd
Columbia, MD 21046-1602
410-992-9922 X5410
800-950-6372

JC Penney
National Parts Center
6840 Barton Road
Morrow, GA 30260
404-961-8400

PerfectData Corporation
110 West Easy Street
Simi Valley, CA 93065
805-581-4000
Fax: 805-522-5788

Peripheral Computer Support
2219 Oakland Road
San Jose, CA 95131
408-263-4043

Perma Power Electronics, Inc.
5627 W Howard St.
Niles, IL 60714-4011
312-763-0763
Fax: 312-763-8330

Pfanstiehl Corp.*D
3300 Washington St.
Waukegan, IL 60085
708-623-1360
800-323-9446
Fax: 708-623-9107

Philips Consumer Electronics*MD
Service Parts
907 Snapp Ferry Rd.
Greeneville, TN 37744-0967
800-851-8885
Fax: 800-535-3715

Philips ECG*D
2001 West Blue Heron Blvd
Riviera Beach, FL 33404
407-881-3308

Philips ECG*D
Baldwin Green Common #109
Woburn, MA 01801
617-932-9070

Philips Technical Training
Service Co.
P.O. Box 555
Jefferson City, TN 37760
615-475-0044
Fax: 615-475-0221

Philips ECG
1001 Snapps Ferry Road
PO Box 967
Greeneville, TN 37744-0967
423-636-5693
Fax: 800-346-6621

Philips Service Company
Old Andrew Johnson Highway
PO Box 555
Jefferson City, TN 37760
615-475-0329
Fax: 615-475-0258

Philtek Power Corp.
4320 Sweet Rd., Unit B
Blaine, WA 98230-9110
360-332-7252
800-727-4877
Fax: 360-332-7253

Pioneer Research
1745 Berkeley St.
Santa Monica, CA 90404
310-829-6751
800-233-1745
Fax: 310-453-3929

Plato Products, Inc.
18371 Railroad Street
City of Industry, CA 91748
818-965-8044
800-423-4510
Fax: 818-965-8960

Platt Luggage, Inc.
4051 W. 51st St.
Chicago, IL 60632
312-838-2000
800-222-1555
Fax: 312-838-2010

Plaza Distributing*D
13268 66th Street N.
Largo, FL 34643
813-531-5484
800-531-5484
Fax: 813-530-1821

Polaris Div. of UXL Corp.
108-02 Otis Ave.
Corona, NY 11368
718-271-5200
Fax: 718-271-5738

J.S. Popper, Inc.
200 Liberty Street
PO Box 206
Little Ferry, NJ 07643
201-641-3252

Portasol, Inc.
3129 Chaucer Drive
Charlotte, NC 28210-4818
704-543-6239
Fax: 704-543-6839

PowerTronics
143 Raymond Road
PO Box 735
Candia, NH 03034
603-483-5876
Fax: 603-483-5938

Projector Recorder Belt*D
P.O. Box 176
Whitewater, WI 53190-0176
414-473-2151
800-558-9572
Fax: 800-887-2727

Preferred Computer Svcs Inc.
6120 West by NW Blvd Suite 100
Houston, TX 77040
713-895-0600
800-2251923
Fax: 713-895-6885

Prelco Electronics
605 Chestnut St.
Union, NJ 07083
908-851-8600
Fax: 908-686-4656

Premium Parts+ Electrncs Co*D
W9390 State Road 59
PO Box 28
Whitewater, WI 53190-0176
414-473-2151
800-558-9572
Fax: 800-887-2727

Prentice Hall PTR
Simon & Schuster Education Grp
One Lake St
Upper Saddle River, NJ 07458
201-236-7139
Fax: 201-236-7131

Prime Technology, Inc.
International Insts. Div.
Twin Lakes Rd PO Box 185
North Branford, CT 06471
203-481-5721
Fax: 203-481-8937

Princeton Computer Support
5 Crescent Avenue
PO Box 787
Rocky Hill, NJ 08553
609-921-8889
800-682-6158
Fax: 609-921-7693

Print Products International*D
8931 Brookville Rd.
Silver Spring, MD 20910
301-587-7824
800-638-2020
Fax: 800-545-0058

Pro-Services
808 North First Street
Grants, NM 87020
505-285-5604

ProAmerica*D
959 E. Collins
Richardson, TX 75081
800-888-9600
Fax: 214-690-8648

Probe Master, Inc.
215 Denny Way
El Cajon, CA 92020
619-258-7412
800-772-1519
Fax: 619-258-7413

Production Devices
215 Denny Way
El Cajon, CA 92020
619-258-7303
800-824-4226
Fax: 619-258-1753

Professional Business Systems
490 W. Arrow Highway, Suite F
San Oiams, CA 91733

Progressive Electronics
325 South El Dorado
Mesa, AZ 85202
602-966-2931
800-967-8602
Fax: 602-967-8602

PROSTAT
1072 Tower Lane
Bensenville, IL 60106
708-238-8883
Fax: 708-238-9717

Protek
154 Veterans Drive
Northvale, NJ 07647
201-767-7242
Fax: 201-784-0611

PTS Corporation
5233 South Highway 37
PO Box 272
Bloomington, IN 47402
812-824-9331
800-844-7871
Fax: 812-824-2848

Q

Q B Products*D
1260 Karl Court
Wauconda, IL 60084-1094
708-487-3333
800-323-6856
Fax: 708-487-2689

Quantum Data
2111 Big Timber Road
Elgin, IL 60123
708-888-0450
Fax: 708-888-2802

Quasar
50 Meadowlands Parkway
Secaucus, NJ 07094
800-447-4700

R

R&K Supply Co.*D
650 W Smith Rd #17
Medina, OH 44256
800-362-6780
Fax: 800-840-TOOL

Racal Instruments Inc.
4 Goodyear Street
Irvine, CA 92718
714-859-8999
800-722-2528
Fax: 714-859-2505

RAG Electronics Inc.*D
Box 2450 Turquoise Circle
Newbury Park, CA 91320
805-498-9933
800-732-3457
Fax: 805-498-3733

RAM Software Enterprises
3434 Bren Lee Court
Indianapolis, IN 46227-7905
317-881-0690
800-323-9654

Ramsey Electronics Inc.
793 Caning Parkway
Victor, NY 14564
716-924-4560
Fax: 716-924-4555

Rawn Co. Inc.
P.O. Box 9
Spooner, WI 54801
715-635-8711
800-826-6791
Fax: 715-635-2200

RCA Consumer Electronics
600 North Sherman Drive
Indianapolis, IN 46201
317-267-5661

Read/Right Products Division
The Texwipe Company
650 East Crescent Avenue
Upper Saddle River, NJ 07458
201-327-9100 X315
800-327-1237
Fax: 800-569-3600

Recoton Corporation
46-23 Crane Street
Long Island City, NY 11101
718-392-6442
800-223-6009
Fax: 718-784-1080

Rehart Engineering
646 Gibbons Street
Los Angeles, CA 90031
213-225-7349

Republic Packaging Corp.
9160 S. Green
Chicago, IL 60620
312-233-6530
Fax: 312-233-6005

Resanonce
5173 Waring Road, Suite 115
San Diego, CA 92120
619-287-3348

Research Specialists Inc.
1816 Settlers Reserve Oval
Westlake, OH 44145
216-871-8909

Reset, Inc.
49 Strathearn Place
Simi Valley, CA 93065
805-584-4900
Fax: 805-583-2900

The Rex Company
12311 Loraleen St.
Garden Grove, CA 92641
714-530-0330
Fax: 714-530-8577

RF Parts*D
435 S Pacific St
San Marcos, CA 92069
619-744-0700

RG Software, Inc.
6900 E. Camelback Rd,
Suite 630
Scottsdale, AZ 85251
602-423-8000

RGD Electronics
107 Trumbull St
Elizabeth, NJ 07206
908-354-2300

Richardson Electronics, Ltd.*D
40W267 Keslinger Road
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800-348-5580
Fax: 708-208-2550

Richmond Static Control Svcs
3101 E. Alejo Rd.
Palm Springs, CA 92262
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800-538-0750
Fax: 619-322-2073

Ripley Company
Miller Tool Division
46 Nooks Hill Rd.
Cromwell, CT 06416
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Fax: 860-635-3631

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RNJ Electronics Inc.*D
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516-226-2700
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Rogers Anti-Static Chemicals
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Fax: 312-276-4371

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1626 Becky Court
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34443 Schoolcraft
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Fax: 313-525-1184

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800-662-0504
Fax: 309-691-2271

Russell Industries*D
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Oceanside, NY 11572
516-536-5000
800-645-2202
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S

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1900 Elk St.
Rock Springs, WY 82901
307-382-5663
800-542-9378
Fax: 307-382-7323

Salen Enterprises*D
P.O. Box 915
Morton Grove, IL 60053
312-736-0999
Fax: 312-736-4238

Howard W. Sams & Company
2647 Waterfront Pkwy E. Drive
Indianapolis, IN 46214
317-298-5400
800-428-SAMS
Fax: 317-298-5604

Sanyo Energy Corp.
1201 Sanyo Ave.
San Diego, CA 92073
619-661-6620
Fax: 619-661-6743

Sargent Tool Company
30 East Industrial Road
Branford, CT 06405

Schematic Solutions, Inc.
13043 Hunters Ridge St
San Antonio, TX 78230
512-696-0404
Fax: 512-696-7135

Schlumberger Technologies
Instruments Div.
P.O. Box 7004
Billerica, MA 01821
508-671-9700
800-225-5765
Fax: 508-671-9704

Schurter, Inc.
1016 Clegg Court
Petaluma, CA 94954
707-778-6311
800-848-2600
Fax: 707-778-6401

SDI Technologies
800 Federal Boulevard
Carteret, NJ 07008-1002
908-855-9750
Fax: 908-855-0224

Sears Industrial Sales
3333 Beverly Rd E3-375A
Hoffman Estates, IL 60179
708-286-6923

Satellite Dealers Association
602 N. Jackson St.
Greencastle, IN 46135
317-653-4301
800-288-3824
Fax: 317-653-8262

Seco Industries
6909 E. Washington Blvd.
Montebello, CA 90640
213-726-9721
Fax: 213-726-9776

SelecTronics, Inc.
Two Tobey Village Office Park
Pittsford, NY 14534
716-248-3875
Fax: 716-248-3868

Semtronics Corp.
PO Box 94
Oldwick, NJ 08858
908-439-2030
800-946-4646
Fax: 404-487-1128

Sencore Electronics
3200 Sencore Drive
Sioux Falls, SD 57107
605-339-0100
800-SENCORE
Fax: 605-339-0317

Service Electronics Inc.
682 Passaic Avenue
Nutley, NJ 07110
201-284-1200 X524
Fax: 201-284-1550

Service Management Software
931 Sunset Boulevard
West Columbia, SC 29169
803-791-5860
Fax: 803-791-8521

Serviceplan, Inc.
1099 18th Street Suite 950
Denver, CO 80202
303-297-9032

Service Systems International
8717 West 110th St,
Suite 600
Overland Park, KS 66210
913-661-0190
Fax: 913-661-0220

ServiceWare Inc.
300 Allegheny River Blvd.
Oakmont, PA 15139
412-826-1158
Fax: 412-826-0577

ServiceWare Corporation
2280 St. Laurent Blvd.,
Suite 104
Ottawa, ON
Canada K1G 4K1
613-521-7391
Fax: 613-521-5595

Servicing Systems
132 Lamplighter Drive
Manchester, CT 06040
860-647-9124
Fax: 860-647-9124

Shape Electronics
2105 Corporate Drive
Addison, IL 60101-1484
708-620-8394
800-367-5811
Fax: 708-620-0784

Sharp Electronics Corp
Sharp Plaza
PO Box 650
Mahwah, NJ 07430-2135
201-529-8200

SHOGYO International Corp.
45 Executive Drive
Plainview, NY 11803
516-349-5200
Fax: 516-349-7744

Sibex, Inc.
1040 Harbor Lake Drive
Safety Harbor, FL 34698
813-726-4343
Fax: 813-726-4434

Sigma Electronics
632 Elkton Dr
Colorado Springs, CO 80907
719-528-1115
Fax: 1-719-522-9291

Signal Measurement Company
PO Box 1607
Tomball, TX 77377-1607
713-356-2584

The Simco Co., Inc.
2257 N. Penn Rd.
Hatfield, PA 19440
215-822-2171
Fax: 215-822-3795

Simpson Electronic Company
853 Dundee Ave.
Elgin, IL 60120
708-697-2260
Fax: 708-697-2272

Sirius Technologies
Route 2, Box 196A
Colfax, WI 54730
715-962-3592
800-359-3592

Sirius Software Inc.
345 West Second St,
Suite 201
Dayton, OH 45402-1443
513-228-4849
800-788-4849
Fax: 513-228-1159

SL Waber, Inc.
520 Fellowship Rd.
Mount Laurel, NJ 08054
609-866-8888
800-634-1485
Fax: 609-866-1945

SMH Electronics Co., Inc.
21 Pattersons Brook Rd.
West Wareham, MA 02576
508-291-7447
Fax: 508-291-7449

DW Smith & Associates
2929 Campus Drive,
Suite 200
San Mateo, CA 94403
415-349-7725
Fax: 415-349-5693

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207 E Prospect Ave
North Wales, PA 19454
215-661-9107
Fax: 215-661-9107

Snap-On Incorporated
2801 80th Street
Kenosha, WI 53141-1410
1-800-973-8665
Fax: 414-656-4980

Soder-Wick Fine-Braid
8125 Cobb Center Drive
Kennesaw, GA 30152
770-424-4888
800-645-5244
Fax: 770-424-4267

Sola Electric
1717 Busse Road
Elk Grove Village, IL 60007
708-439-2800
800-TRY-SOLA
Fax: 800-626-6269

SAT/ A SPIRIG CO.
Solder Absorbing Tech. Inc.
Springfield, MA 01108-1787
413-788-6191
800-628-8862
Fax: 413-788-0490

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26 Pearl St.
Norwalk, CT 06850
203-849-3111
800-SOLO-MAT
Fax: 203-847-9320

Sonera Technologies
PO Box 565
Rumson, NJ 07760
908-747-6886
800-932-6323
Fax: 908-747-4523

Sony Service Company
Sony Drive
Park Ridge, NJ 07656
201-930-1000

Sony Service Co.
National Parts Div.
8281 N.W. 107th Terrace
Kansas City, MO 64153
816-891-7550
Fax: 800-821-5662

Sony Technician Devel. Ctr.
390 University Ave.
Westwood, MA 02090
617-329-8308

SOS Computer Solutions*D
PO Box 794
Greenland, NH 03840-0794
603-433-1600
800-767-2554
Fax: 603-433-7367

Specialized Prods Company*D
3131 Premier Drive
Irving, TX 75063
214-550-1923
800-234-8286
Fax: 214-550-8286

Spectrum Computer Technologies
2150 Liberty Drive
Niagara Falls, NY 14304
716-283-0825
800-879-3225
Fax: 716-283-0828

Spencer Industries
PO Box 449
Dale, IN 47523
812-937-4561
Fax: 812-937-4637

A.W. Sperry Instruments, Inc.
P.O. Box 9300
Smithtown, NY 11787
516-231-7050
800-645-5398
Fax: 516-434-3128

Sperry Tech, Inc.
PO Box 5234
Lincoln, NE 68505
402-489-4054
800-228-4338

Spi-Ro Manufacturing, Inc.
PO Box 5500
Lakeland, FL 33807-5500
813-646-7925

Sprague Magnetics, Inc.*D
15720 Stagg St.
Van Nuys, CA 91406
818-994-6602
800-553-8712
Fax: 818-994-2153

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52 Railroad Ave.
Valley Stream, NY 11580
516-872-8100
800-341-0003
Fax: 516-872-8118

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Dayton, OH 45403
513-253-1191
Fax: 513-253-1723

Start International*D
3361 Boyington Suite 120
Carrollton, TX 75006
214-960-1986
800-259-1987
Fax: 214-702-9551

Static Prevention Inc.
211 Gemini Ave.
Brea, CA 92622
714-680-6478
Fax: 714-680-6583

Statics-End
761 Penarth Avenue
Walnut, CA 91789
800-895-0555

Statx
RTW International Corporation
1110 Lake Cook Rd,
Suite 150
Buffalo Grove, IL 60089
708-520-0007
Fax: 708-520-1951

Herman H. Sticht Co., Inc.*D
57 Front St.
Brooklyn, NY 11201
718-852-7602
800-221-3203
Fax: 718-852-7915

Stoner, Inc.
PO Box 65
Quarryville, PA 17566
800-227-5538
Fax: 800-515-5150

Sun Equipment Corporation
PO Box 97903
Raleigh, NC 27624-7903
919-870-1955
Fax: 919-870-5720

Superior Electric
383 Middle Street
Bristol, CT 06010
860-585-4500
800-787-3532
Fax: 860-582-3784

Support Systems International
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150 S. Second St.
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800-777-6269
Fax: 510-233-8888

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Computer Power Division
215 N. Cayuga
Ithaca, NY 14850
607-277-4301
800-326-8119
Fax: 607-277-6983

Symantec Corp.
10201 Torre Avenue
Cupertino, CA 95014-2132
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SyncPulse Software
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Tujunga, CA 91042
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Fax: 617-245-6311

Synergetix
310 South 51st St
Kansas City, KS 66106
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Fax: 913-342-6623

Syon Corporation
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San Leandro, CA 94577
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Fax: 510-895-2947

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Fields Lane, Bldg 2
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Fax: 914-277-3995

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800-322-3690
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Fax: 215-540-8327

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6551 Cochran Road
Solon, OH 44139
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800-321-3807
Fax: 216-248-4571

Team Systems, Inc.
2934 Corvin Drive
Santa Clara, CA 95051
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800-338-1981
Fax: 408-720-9643

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Pearl River, NY 10965

Tech Assist, Inc.
11350 66th St #105
Largo, FL 34643
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800-274-3785
Fax: 813-547-0768

Tech Spray, Inc.
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Amarillo, TX 79105-0949
806-372-8523
Fax: 806-372-8750

Tech Support BBS
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Akron, OH 44312-6235
216-733-0750

Tech-M
9720 Executive Center Dr.
Suite 203
St. Petersburg, FL 33702
813-576-1884
800-576-1881
Fax: 813-577-7207

Technicians Helper*D
1821 Walden Office Sq #443
Schaumberg, IL 60173
708-397-5881
Fax: 708-397-5884

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50 Meadowlands Parkway
Secaucus, NJ 07094
800-447-4700

Techni-Tool, Inc.*D
5 Apollo Road
PO Box 368
Plymouth Meeting, PA 19462-0368
610-941-2400
Fax: 610-828-5623

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13 James St
Putnam Valley, NY 10579
914-528-3774
Fax: 914-526-3558

Teclab
Kalamazoo Technical Furniture
P.O. Box 1165
Kalamazoo, MI 49005
616-372-6000
800-832-5227
Fax: 616-372-6116

Tegam Inc.
7230 N. Ridge Road
Madison, OH 44057
216-428-7505
Fax: 216-428-1068

TEKSERV
127 Riverneck Road
Chelmsford, MA 01824
508-459-9480
Fax: 508-453-6336

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Electronic Service Tools
PO Box 500,
Mail Sta. 47-100
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503-627-4066
Fax: 503-627-5622

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Mail Sta. 47-847
Beaverton, OR 97077
503-627-2879

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Personal Test Instruments Div
PO Box 500, Mail Sta 47-678
Beaverton, OR 97077
503-627-4990

Tektronix, Inc.
Measurement Business
PO Box 500
Beaverton, OR 97077
800-426-2200
Fax: 413-448-8033

Tektronix Test & Meas. Group
P.O. Box 1529
Pittsfield, MA 01202
800-246-2200

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New Milford, CT 06776
203-355-8285
Fax: 203-355-8285

Telogy*D
3885 Bohannon Drive
Menlo Park, CA 94025-1001
415-462-9000
800-835-6494
Fax: 415-462-5152

Temptronic Corp.
55 Chapel St.
Newton, MA 02158
617-969-2501
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Fax: 617-969-2475

Ten-Lab
2217 Malcom Avenue
Los Angeles, CA 90064
310-474-6909
Fax: 310-441-1807

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El Dorado Hills, CA 95762
916-939-4005
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Fax: 916-939-4114

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9178 Brown Deer Road
San Diego, CA 92121
619-552-2090
800-368-5719
Fax: 619-535-1260

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PO Box 575
Upper Saddle River, NJ 07458
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800-648-9473 Ext 292
Fax: 201-327-5945

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800-782-8422
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317-267-5799

Thomson Consumer/Svc Eng
600 N Sherman
Indianapolis, IN 46201
317-587-4347

Thordarson-Meissner
628 Belmont Street
Mount Carmel, IL 62863
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Fax: 618-263-3150

3E Corp.
Monitor Repair
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Chicopee, MA 01013
413-594-2772
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Fax: 413-594-7283

3M Company
5 North 3M Center Bldg 223
Saint Paul, MN 55410
612-733-8872

3M Consumer & Pro
Video & Audio Markets Div.
3M Center, Bldg 233-5N-01
St. Paul, MN 55144-1000
612-733-1082

3M Electrical Specialties Div
6801 River Place Blvd
A130-3N-156
Austin, TX 78726-9000
800-665-7862
Fax: 319-395-9719

3M Electronic Prods Division
MS 130-3N-27
PO Box 2963
Austin, TX 78769
512-984-1800

3M Magnetic Media Division
Building 223-5N-01, 3M Center
St. Paul, MN 55144-1000

TIF Instruments, Inc.
9101 N.W. Seventh Ave.
Miami, FL 33150
305-757-8811
800-327-5060
Fax: 305-757-1028

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Poway, CA 92064
619-679-0303
800-779-8170
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Tech. Info. Procurement Serv.
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Forest Park, GA 30051-1681
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Tool Tron Industries
103-A Parkway
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210-249-8277
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The Tool Resource*D
PO Box 1106
W. Dundee, IL 60118
708-468-0849
708-468-0849

Topline
PO Box 5100
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TOPS Computer Company*D
461 Boston Street, E-2
Topsfield, MA 01983
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Fax: 508-887-9216

Toshiba America Info Sys, Inc.
9740 Irvine Boulevard
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Irvine, CA 92713-9724
714-587-3000
Fax: 714-587-6849

Toshiba America Consumer Prod.
Service Division
1420 Toshiba Drive
Lebanon, TN 37087
615-449-2360
Fax: 615-444-7520

Total Power International
418 Bridge St.
Lowell, MA 01850
508-453-7272
Fax: 508-453-7395

Tote Vision
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Touchstone Software Corp.
2124 Main Street, Suite 250
Huntington Beach, CA 92648
714-969-7746
800-531-0450
Fax: 714-969-1555

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Fax: 404-922-8044

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Trio-Tech Static Systems
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1 Triplett Drive
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Abingdon, MD 21009
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Fax: 800-888-3293

Trompeter Electronics
31186 La Baya Drive
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818-707-2020
800-982-COAX
Fax: 818-706-1040

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1875 Century Park E Suite 1880
Los Angeles, CA 90067-2519
818-891-2345
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Fax: 818-891-5251

Tucker Electronics Co.
P.O. Box 551419
Dallas, TX 75355-1419
214-348-8800
800-527-4642
Fax: 214-348-0367

TV Man Tech Tips Inc.
Suite # 2-112
7040 W Palmetto Park Rd
Boca Raton, FL 33433
407-750-9922
800-474-3588

UBM Corp
415 Hope Ave
Roselle, NJ 07203
908-241-8652
Fax: 908-241-7288

Ucando VCR Educational Prod Co
P.O. Box 928
Greenville, OH 45331
513-548-6113
800-678-6113
Fax: 513-548-6124

Ultech Corp
28C Great Hill Road
Seymour, CT 06483
203-735-5805
Fax: 203-735-6653

Ultra-X, Inc.
1765 Scott Blvd Suite 101
Santa Clara, CA 95050-4138
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800-722-3789
Fax: 408-988-4849

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333 Pfingsten Road
Northbrook, IL 60062-2096
847-272-8800
Fax: 847-272-0919

Ungar, A Rubbermaid Co.
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Buena Park, CA 90621
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Fax: 714-523-7790

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Fax: 708-946-9200

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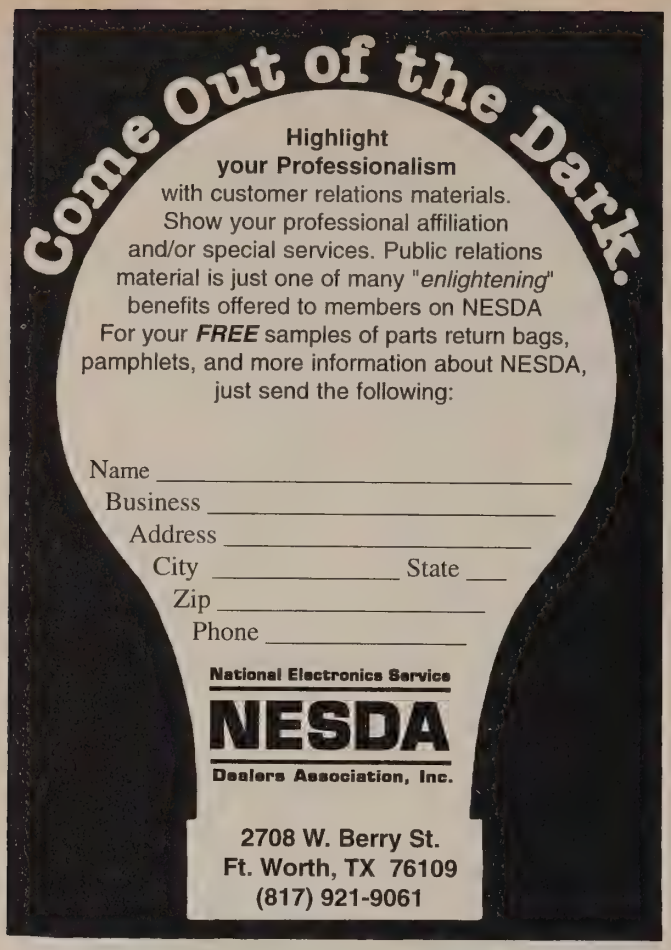
P.O. Box 1658
Longmont, CO 80501
303-651-3184
Fax: 303-651-3405

United Servicers Association
P.O. Box 626
Westmont, IL 60559
708-968-6752
Fax: 708-719-0041

Universal Electronics
6138 Riverview Rd.
Peninsula, OH 44264

Universal Enterprises (UEI)
5500 S.W. Arctic Drive
Beaverton, OR 97005
503-644-8723
800-547-5740
Fax: 503-643-6322

Uptime Service Association
14450 NE 29th Place #116
Bellevue, WA 98007
206-869-6668
Fax: 206-869-6229



ES&T Calendar

MECP Testing
March
Raleigh, NC (3/7)
Houston, TX (3/14)
Salt Lake City, UT (3/21)
Omaha, NE (3/28)
703-907-7689

Mobile Electronics Show
April 19-21, 1996
Orlando, FL
703-907-7500

CES Orlando '96—
The Digital Destination
May 23-25, 1996
Orlando, FL
703-907-7500

CES Habitech
May 23-25, 1996
Orlando, FL
703-907-7500

1996 CES Specialty Audio and
Home Theater Show
May 23-25, 1996
Orlando, FL
703-907-7500

1996 Satellite Dealers
Association
Annual Conference
June 13, 14, 15
Faribault, MN 55303
800-288-3824

ServiceTech '96:
Fourth Annual
Conference of Innovation
in Services
Technology
September 9-12
Boston, MA
800-333-9786 or
941-275-7887

26th World Conference and
Exihibition
October 27-29
San Diego, CA
800-333-9786 or
941-275-7887

Utilimaster
65266 State Road 19
PO Box 585
Wakarusa, IN 46573
219-862-4561
800-582-3454
Fax: 219-862-2071

V

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253 Broadway
Lynbrook, NY 11563
800-843-3624

Valtron Technologies
28309 Avenue Crocker
Valencia, CA 91355
805-257-0333
800-2-VALTRON
Fax: 805-257-0114

Vector-VID Inc.
189 Horsham Road
Horsham, PA 19044
215-672-6702
Fax: 215-672-3411

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611 Wangum Rd
Fishers, NY 14453
716-924-2073
Fax: 716-924-2136

Verite
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Harbor City, CA 90710-0697
310-832-1100
Fax: 310-832-1100

Vicom
11603 165th Street
Edmonton, Alberta, CA T5M3Z1
403-452-4082

Video Display Corporation
1868 Tucker Industrial Drive
Tucker, GA 30084
404-938-2080
800-241-5005
Fax: 404-493-3903

Video Services
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Spring, TX 77379
713-370-0600

Vintage TV and Radio Supply*D
3498 West 105th Street
Cleveland, OH 44111
216-671-6712

Virtual Industries
20 Mount View Lane, # E
Colorado Springs, CO 80907
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800-530-8377
Fax: 719-594-0147

V-M Corporation
305 Territorial
PO Box 426
Benton Harbor, MI 49023
616-925-8841

Voltura Enterprises, Inc.
10 Converse Place
Winchester, MA 01890-2713
617-721-4920
Fax: 617-721-7316

VRS Electronics
681 St. Mary's Rd.,
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Winnipeg, Manitoba
Canada R2M3MB
204-253-9559

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San Diego, CA 92121
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Fax: 619-452-2543

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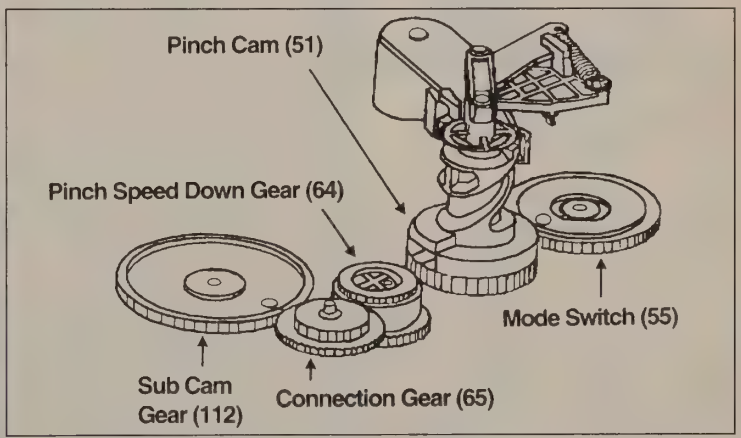

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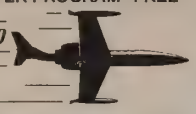

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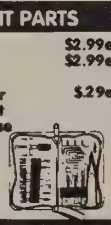

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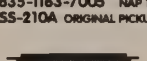

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BOOKS

The TAB Electronics Guide to Understanding Electricity and Electronics, McGraw-Hill, Inc., By G. Randy Slone, 304 pages, 225 illus., Paperback $16.95, Hardcover $26.95

For novices who want a comprehensive yet non-threatening introduction to electronics, The TAB Electronics Guide to Understanding Electricity and Electronics fills the bill. Author G. Randy Slone's practical, reader-friendly volume supplies information and advice necessary to understand and develop a working knowledge of electricity and electronics.

The first half of the book is devoted to the fundamentals, preparing readers for coverage of more advanced topics in the second section. Interspersed throughout are motivational and easy-to-build projects that promote an understanding of how electricity and electronics work. These useful and entertaining projects include: soldering iron controller, a lab-quality power supply, a general-purpose battery charger, logic probes and pulser, a sound effect generator, and a state-of-the-art MOSFET audio amplifier.

This resource also contains information-packed appendices with schematic symbols and common equations, equipment and materials sources, and suggestions for further reading.

The author is an electrical engineer with nearly 20 years of experience in data processing and industrial electronics. A former college instructor,he is a private engineering consultant whose clients have included DuPont and Ralston Purina.

McGraw-Hill, Inc, Blue Ridge Summit, PA 17294-0850

Troubleshooting, Maintaining, & Repairing Personal Computers: A Technician's Guide, By Stephen J. Bigelow, McGraw-Hill, Inc., 1104 pages, 350 illus., Paperback $44.95, Hardcover $70.00 (disk included)

Emphasizing hands-on repair techniques rather than theory, Troubleshooting, Maintaining, & Repairing Personal Computers: A Technician's Guide, is a practical and comprehensive technician-level guide. This volume's 1000-plus pages are filled with advice and information, including nearly 400 specific problems completely detailed and explained. In addition, the bundled disk contains a large collection of diagnostic freeware, shareware, and utilities that will prove invaluable to anyone who needs to troubleshoot and repair computers.

Covering IBMs and compatibles, including Pentiums, author Stephen J. Bigelow provides hundreds of POST and diagnostic codes to help readers pinpoint and correct even the rarest problems. He discusses hardware and operating systems, providing information on interpreting symptoms and performing diagnostics on computers and peripherals. He also covers optimizing and upgrading PCs.

This easy-to-use reference is divided into three sections, the first of which is a technician's primer, serving as the book's technical foundation. The second section provides an extensive array of service procedures, and the third offers practical advice and procedures for maintenance and support. Nine appendices include resource and reference information, useful forms, a sample technician's certification test, and more.

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Oscilloscopes, How to Use Them, How They Work Fourth Edition, By Ian Hickman, Butterworth Heinemann, 272 pages, 120 illus, $32.95

Oscilloscopes are essential tools for checking circuit operation and diagnosing faults, and an enormous range of models is available. But which is the right scope for a particular application and which features are essential? This new

edition covers the latest models of oscilloscopes, including digital storage oscilloscopes, digital sampling oscilloscopes, time-domain reflectometers for use on metallic and optical transmission systems, and ultra high-speed single-shot event recorders. Other topics include the use of x/y and x/t plotters, thermal and dot matrix printers (whether built-in or otherwise) as oscilloscope hardcopy output devices, and the use of personal computers with expansion cards providing oscilloscope or logic analyzer facilities.

Butterworth-Heinemann, 313 Washington Street, Newton, MA 02158-1626

Understand Electronic Filters, By Owen Bishop, Butterworth Heinemann, 180 pages, $24.95

This book covers a field of electronics that is very mathematical and often presents difficulty to electronics students at all levels. It aims to provide the reader with enough mathematics to really understand what electronic filters are, how they work, and how to use them. It proceeds in easy stages to describe the structure, action and uses of filters, introducing and explaining the necessary math at each stage. The book assumes a minimum knowledge of electrical and electronic theory on the part of the reader.

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Practical Electronics Handbook, Fourth Edition, By Ian Sinclair, Butterworth Heinemann, 400 pages, $29.95

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Toshiba VCR model M-6550. Need service manual and schematic diagram. *Contact: Dean Leonard, PO Box 20845, Chicago, IL 60620, 312-497-3497, 10AM-10PM CST.*

Panasonic b/w video camera, model WV-341P, s/n 965110, mfd. 6/79, need schematic. Will copy and return, or pay for copy. *Contact: Victor Meeldijk, 210-337-2764, DRS, 138 Bauer Drive, Oakland, NJ 07436.*

Minolta camcorder model CR-10005AF or equivalent Hitachi or RCA Grand made in 1985, need electronic view finder. *Contact: Charles,360-825-6097.*

Sencore PR570 Powerite II or Powerite I variable isolation transformer and safety analyzer with accessories and manual. New or used, reasonably priced. *Contact: Sidney Karam, 228 Victoria Road 1, Dartmouth, N.S. B3A 1W7, Canada, 902-465-7586, Fax 902-466-0061.*

Sears 19 inch color TV model no. 564.42040450, need vertical output module. *Contact: Hubert Pitt, 14 Nebo Road, Newbern, TN 38059.*

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Kenwood KX-900 cassette deck, desperately seeking service information. *Contact: John Phipps, 1412 Navaho Trail, St. Charles, MO 63304.*

MGA Mitsubishi projection CRTs for VE -500U, Collins radios, manuals for Sprague TEL-OHMIKE TO-3, TO-6, Hickok 5055, Rider Chanalyst, 6550 tubes. *Contact: Hank, 1-800-364-4265.*

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Panasonic RS-876S need schematic, it is no longer available. Browning Golden Eagle Mark III need original or copy of owners manual. *Contact: Stephen Hall, PO Box 401, Winfield, WV 25213, 304-586-4884.*

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Heathkit GR2001 TV, need power supply, vertical oscillator and remote control boards. *Contact: Channing Smith, 406 Summit, Blytheville, AR 72315.*

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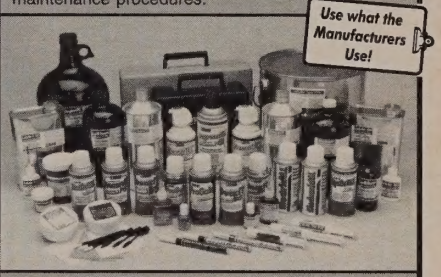

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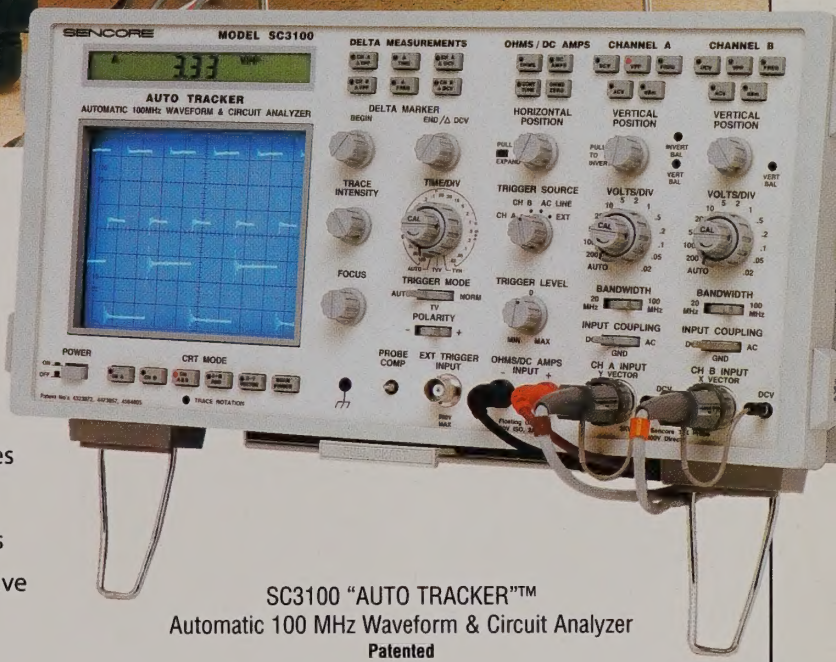

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